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ABSTRACT

This study was designed to assess the effect the summer vacation period has on the reading ability of first-grade subjects, as measured by norm- and criterion-referenced reading tests. The data were analyzed to determine if sex of subject, IQ, or type of school reading curriculum were related to the ability to retain overall reading ability or specific reading skills. Subjects in the study were 311 first-grade pupils enrolled in nine northeastern Wisconsin elementary schools. Approximately one-half of the subjects were enrolled in an objective-based reading program while the remaining subjects were enrolled in basal reader curricula. It was concluded that sex of subject, intellectual ability, and type of school reading curriculum do not appear to be important variables related to the retention of overall reading ability and specific reading skills. While significant losses were found on 11 of the 14 measures, when the data were examined in terms of percentage of subjects considered to have mastered the skills in the spring and fall, only 15 percent of the subjects needed to be recategorized. (Author/RB)

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Technical Report No. 263

SEX, INTELLIGENCE, AND SCHOOL READING CURRICULUM AS FACTORS INFLUENCING SUMMER RETENTION OF OVERALL READING ABILITY AND SPECIFIC READING SKILLS OF FIRST-GRADE SUBJECTS

Report from the Project on Conditions of
School Learning and Instructional Strategies

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STATEMENT OF FOCUS

Individually Guided Education (IGE) is a new comprehensive system of elementary education. The following components of the IGE system are in varying stages of development and implementation: a new organization for instruction and related administrative arrangements; a model of instructional programing for the individual student; and curriculum components in prereading, reading, mathematics, motivation, and environmental education. The development of other curriculum components, of a system for managing instruction by computer, and of instructional strategies is needed to complete the system. Continuing programmatic research is required to provide a sound knowledge base for the components under development and for improved second generation components. Finally, systematic implementation is essential so that the products will function properly in the IGE schools.

The Center plans and carries out the research, development, and implementation components of its IGE program in this sequence: (1) identify the needs and delimit the component problem area; (2) assess the possible constraints--financial resources and availability of staff; (3) formulate general plans and specific procedures for solving the problems; (4) secure and allocate human and material resources to carry out the plans; (5) provide for effective communication among personnel and efficient management of activities and resources; and (6) evaluate the effectiveness of each activity and its contribution to the total program and correct any difficulties through feedback mechanisms and appropriate management techniques.

A self-renewing system of elementary education is projected in each participating elementary school, i.e., one which is less dependent on external sources for direction and is more responsive to the needs of the children attending each particular school. In the IGE schools, Center-developed and other curriculum products compatible with the Center's instructional programing model will lead to higher morale and job satisfaction among educational personnel. Each developmental product makes its unique contribution to IGE as it is implemented in the schools. The various research components add to the knowledge of Center practitioners, developers, and theorists.

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ABSTRACT

This study was designed to assess the effect the summer vacation period has on the reading ability of first-grade subjects, as measured by norm- and criterion-referenced reading tests. The data were analyzed to determine if sex of subject, IQ, or type of school reading curriculum were related to the ability to retain overall reading ability or specific reading skills.

Subjects in the study were 311 first-grade pupils enrolled in nine northeastern Wisconsin elementary schools. Approximately one-half of the subjects were enrolled in an objective-based reading program while the remaining subjects were enrolled in basal reader curricula.

All subjects were administered the Gates-MacGinitie Reading Test, Primary A, and the Wisconsin Tests of Reading Skill Development-Word Attack, Level B, two weeks prior to and two weeks after the summer vacation period. In addition, the California Short-Form Test of Mental Maturity was administered to all subjects during the spring testing sessions. Subjects with IQ scores which fell within the third or seventh stanines were not included in the data analysis. A multiple analysis of variance statistical treatment was used to analyze the data. Retention of reading scores between the spring and fall was the dependent variable; sex of subject, intelligence, and type of school reading curriculum were the independent variables.

Statistically significant differences were found between the mean spring and fall test scores on eleven of the fourteen measures. Sex of subject and type of school reading curriculum were not significantly related to ability to retain reading skills. Intelligence of subjects was found to be related to retention ability on only two of the measures.

Fifteen percent of the subjects changed from being considered "masters" of the specific reading skills in the spring to being classified as "nonmasters" in the fall. Achieving a score of eighty percent or better on any of the specific skill tests was the criterion for mastery.

It was concluded that even though statistically significant losses occurred on most of the tests, the most meaningful measure of change was the difference between the percentage of subjects considered to have mastered the skills in the spring versus the percentage in the fall. The fifteen percent change between the two times was not considered great enough to suggest massive schoolwide retesting of all subjects in criterion-referenced reading programs. Instead, retesting of subjects might be done on the basis of teacher subjective judgment, thereby reducing considerably, the cost and time necessary to implement such a reading program.

In conclusion, then, sex of subject, intellectual ability, and type of school reading curriculum do not appear to be important variables related to the retention of overall reading ability and specific reading skills. While significant losses were found on eleven of the fourteen measures, when the data were examined in terms of percentage

of subjects considered to have mastered the skills in the spring and fall, only fifteen percent of the subjects needed to be recategorized.

CHAPTER I

INTRODUCTION

The purpose of this study was to determine the degree to which first-grade subjects retain their reading ability over the summer vacation period. This investigation examined two aspects of reading ability: overall reading ability as measured by a norm-referenced reading test, and specific reading skills as measured by criterion-referenced reading tests. In addition, the data were examined to determine if there were significant retention rate differences between males and females, between above-average, average, and below-average mental ability subjects, and between subjects enrolled in an objective-based reading program versus those in traditional basal reader programs.

Review of the Literature

The ability to retain information has long interested psychologists and educators. Retention of school subject matter over extended periods of time has received little emphasis during the past decade, however. Most investigations measuring retention ability of school subject matter were conducted before the 1950's. One of the earliest attempts to measure retention ability, for example, was the study done by Irmina (1928). She examined retention ability of first through

seventh grade subjects using eleven different measures. Intelligence, as well as reading, mathematics, and spelling ability, was measured. Tests were administered to her subjects the last week of school in the spring and within fourteen days after they returned to school in the fall. She concluded that the word recognition ability of first and second graders was not seriously affected by the vacation period. The Word Reading, Phrase Reading, and Sentence Reading subtest scores loss of first grade subjects was significant, but for second grade subjects the loss was only slight in two of the three schools studied and a gain was reported in the third school. On the Reading of Directions subtest of the Gates Primary Reading Tests, a consistent loss was found in grade one. In grade two, however, the subjects in two of the schools reported a slight gain. Subjects in all three schools indicated a gain in reading ability at the second grade level as measured by the Stanford Primary Reading Examination, Paragraph Reading subtest. Irmina (1928) cautioned, however, that the scores from only one school represented what could, " . . . be considered a real gain [p. 29]." There were no significant changes in scores for second graders on the Sentence Meaning subtest of the Stanford. And, subjects in only one school lost in ability on the Word Meaning subtest. She concluded that, " . . . there no longer appears to be any actual loss in reading ability due to a non-school period [p. 30]."

Brueckner and Distad (1924) examined the reading retention ability of students in twelve first-grade classrooms. Using the Minneapolis Primary Reading Test and the Haggerty Reading Examination,

Sigma I, they found that median scores for each grade were lower in September than they were in June on the former test, but on the Haggerty Reading Examination there was no difference [p. 701]. Using the Haggerty Reading Examination, Sigma I, in another study, Morrison (1924) found that the median scores of first grade subjects actually increased over the summer. This finding must be interpreted with caution, however, since his first grade sample included only forty-five subjects, all from the same school. When scores from subjects in grades one, two, and three were examined together, seventy percent of the subjects improved while thirty percent lost. He concluded, however, that there was, " . . . practically no change in their reading ability [p. 249]."

A larger number of studies has been conducted with older subjects. In an effort to determine what effect the summer vacation period has on intermediate grade subjects' reading ability (grades 3-6), Elder (1923) tested 203 subjects in May and September with the Monroe Standardized Silent Reading Test. When the data were analyzed without reference to grade, it was discovered that 59 percent of the subjects improved, 27 percent regressed, and 15 percent stayed the same. The average gain per pupil during the four and a half month interval was .45 of a school grade. Elder also found the range of performance to be greater in September than in May. An important limitation in the Elder study, though, was the fact that the May test was administered almost one month before school adjourned for the summer.

Townsend's (1951) investigation has the same limitation. Classroom instruction continued one month after the spring tests were administered and, in the fall, another month of instruction was carried out before the post assessment was conducted. Using the Stanford Achievement Tests, and following fifty-six subjects over three grades and two summers, she found the lowest test-retest correlation on the Reading subtest to be .883. Even though high correlations between test scores were found, she cautioned that care must be exercised when interpreting her data. Correlations between two consecutive fall test scores, for example, were usually higher than consecutive spring-fall test scores.

Keyes and Lawson (1937) also tried to determine the stability of subjects' standardized test scores over an extended period of time. Their subjects originally included 164 fourth, fifth, and sixth graders in Gilbert, Minnesota. The two investigators tested subjects on the Unit Scales of Attainment each fall and spring between 1933 and 1937. The test included eleven subtests: Reading, Arithmetic Operations, Problem Solving, American History, Geography, Elementary Science, Literature, Spelling, English Usage, Capitalization, and Punctuation. Tests were administered one month before school dismissed in May and were readministered one month after school resumed in the fall. The investigators found that the Reading score did not decrease during the five-month interval. On the other hand, the gain was not as great as if the subjects would have received five months of instruction. It is interesting to note, too, that while the mean Reading score did not

decline, there was a loss in the mean Arithmetic, Science, and Literature scores.

Parsley and Powell (1962) randomly selected ninety males and ninety females at the second through seventh grade levels with intelligence quotients between 90 and 110 as measured by the California Test of Mental Maturity. The California Achievement Test was used to determine if reading ability was retained over the summer vacation period. They found that Reading Vocabulary scores tended to increase, by grade level, over the summer, up to grade five. Or, stated another way, while there was a slight loss in mean scores at the second grade level, there was no loss at the third grade level and an actual gain at the fourth and fifth grade level. A similar trend was evident when Reading Comprehension scores were examined across the grades.

The relationship between ability to retain skills and intelligence is unclear. Some investigators, such as Irmina (1928) and Morrison (1924), have been concerned with the gain or loss of intelligence over the summer vacation period. Cook (1924 and 1952), however, was more interested in subjectively comparing the summertime academic diligence of students with intelligence quotients above and below 100. From her investigations, she concluded that subjects above 100 IQ, " . . . were more faithful to their work than those with intelligence quotients below 100 [1942, p. 218]." Unfortunately, the poor design of her study prohibits the drawing of any definite conclusions about the effect intelligence has on retention.

Other investigators take a more sophisticated approach to the intelligence-reading retention question. Parsley and Powell (1962) and Orr (1966), for instance, used intelligence quotients to identify and group their subjects as "average" or mentally retarded. Trying to answer the question relating to interaction between reading and intelligence, Brueckner and Distad (1924) found that children scoring lower on the Detroit Kindergarten Test lost most in reading ability over the summer. Kohlberg (1934) subdivided the Van Wagenen American History Scales into easy, average, and difficult thirds. He discovered that subjects with higher intelligence lost less than did those with lower intelligence. After examining the easiest items on the test, however, he concluded that, " . . . retention ability on tasks which can be accomplished with a great degree of ease cannot be predicted even though the mental rating of a pupil is known [p. 283]." When Kohlberg's total group was examined, however, he found no relationship between retention and intelligence. Spitzer (1939), comparing subjects who scored on the upper- versus lower-one-third of his test, found:

> " . . . the curve of retention of pupils of inferior learning ability begins to level . . . seven days after learning. At the same time the curve for the pupils with superior learning ability does not begin to level until twenty-one days after the learning period [p. 648]."

Vergason (1966) and Orr (1966) measured the effect of teaching hardware on retention ability. Using a paired-associate learning task, Vergason found that his mentally retarded subjects trained with the automated procedure benefitted significantly ($p<.05$) over subjects not receiving the treatment. The method of instruction-retention

interval was also found to be significant ($p<.05$). Orr found the favorable effects to decrease over one and two month retention intervals. The bimodal (audiovisual) procedure used in his experiment did not adversely affect retention, however.

In an attempt to answer the question of the effect of instructional materials on retention ability of bilingual subjects, Arnold (1968) administered the Metropolitan Achievement Tests, Primary Level II, the Test of Reading, Interamerican Series, Level 2, and the Prueba de Lectura, Serie Interamericana, Nivel 2, to 287 second graders who were receiving three different types of language training and instruction in the AAAS Science Program. The treatment groups were (a) Oral-Aural English, (b) Oral-Aural Spanish, and (c) No Oral-Aural. After the four months of summer vacation, the No Oral-Aural group showed consistent, and in some cases, significant losses. The Oral-Aural English and Spanish groups did not differ significantly in retention except on the Interamerican Series where the differences favored the Oral-Aural Spanish group.

Working with older subjects, Orr (1968) exposed a treatment group of sailors to a programmed text while his control group received the usual lecture method. After retesting at one-day, one-week, and two-week intervals, using a t-test for correlated means, he found that none of the differences reached statistical significance. He concluded that the programmed instruction approach enabled his subjects to retain as well as those subjects receiving the conventional lecture method.

Scott (1967), exploring the relationship between retention and type of instruction, reported two studies investigating retention of mathematics ability after receiving instruction in either a modern or traditional mathematics program. Using an analysis of variance technique, he found no significant differences in retention ability attributable to the two instructional programs at the first and second grades in one study. In the other investigation, no significant differences in retention ability were found at the third, fourth, and sixth grade levels. He found a significant difference ($p<.01$) favoring the traditional group in the first study, while in the second study he found a significant difference ($p<.01$) favoring the modern mathematics group at the fifth grade level. Overall, however, there was little difference in retention between the two programs.

The effect of summer vacation on the retention ability of kindergarten subjects exposed to two different programs was the focus of Hillerich's (1965) investigation. He examined subjects' ability to use context, find letters, listen for letter sounds, and match letters and sounds. Subjects enrolled in kindergartens where a workbook was used retained significantly ($p<.01$) less than non-workbook subjects. The mean loss on the fifty-eight items was only 2.15 raw scores points, however. Hillerich stated that this was evidence that, " . . . the skills were retained over the summer vacation [p. 317]."

Educators have always been interested in the effect of programs designed to improve or maintain reading ability during the summer. One of the first attempts to measure the effects of a summer program was

a study conducted by Cook (1942). She designed work envelopes that included practice materials for reading and writing, which were sent home with first graders for the summer. Second graders received books, word lists, and arithmetic fact cards. She found, generally, that the less practice during the summer, the greater the loss of ability. These data must be interpreted with caution, however, since the sizes of the samples were small and the actual time of posttesting was not mentioned.

Cook (1952), in another study measuring the effect of a summer program designed to increase reading achievement, devised four different types of summer programs similar to those in her earlier study. She found that, " . . . whenever children engaged in some systematic plan for summer reading, test results indicated significant improvement over their gain when they participated in no reading plan [p. 415]." Again, her results must be interpreted with skepticism since no statistics were given and yearly gains or losses were not stated.

Golhor and McCrossan (1966) conducted a more elaborate investigation into the effects of a summer library club program on the reading retention of fourth grade subjects. They found spring reading test scores, fourth grade reading scores, and the subjects' intelligence test scores to be better predictors of fall reading test scores than membership in the summer reading club. While club members did score better than nonmembers, this should have been expected since all club members were volunteers. And, this study must be interpreted in light of the fact that little was known about what actually

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transpired during the club membership program. The amount and type of reading members did was not specified, nor was the total amount of time devoted to reading per day explained.

Hypotheses

Several trends are evident in studies of summer retention of reading ability. First, reading ability has been measured only with standardized silent reading tests and never with criterion-referenced reading tests. While studies using norm-referenced instruments may have provided insights for educators concerned with summative evaluation of reading programs, they provide little guidance for teachers who use criterion-referenced reading tests for formative evaluations. The recent appearance and popularity of criterion-referenced reading programs implicitly raises the question of long-term reading skill retention. Secondly, the relationship between intelligence and the retention of reading ability is unclear. While some investigators have measured changes in intelligence scores during the summer vacation, few have used intelligence scores to group subjects according to above-average, average, and below-average mental ability. Finally, the relationship between curricula and retention of reading ability is relatively unknown. This is especially true when examining the ability of subjects to retain reading ability over the summer vacation after being enrolled in either spiral- or objective-based curricula during the school year.

The purpose of this study, then, was to measure the extent to which reading ability is retained over the summer vacation. The hypotheses were:

1. There will be no significant difference between spring and fall Gates-MacGinitie Reading Tests or the Wisconsin Tests of Reading Skill Development reading scores.

2. There will be no significant difference in retention ability between males and females.

3. There will be no significant difference in retention between subjects of above-average, average, and below-average mental ability.

4. There will be no significant difference in retention ability of subjects enrolled in the objective-based reading skills program versus subjects enrolled in the basal reader curricula.

In addition to examining the four hypotheses, answers to the following questions were sought:

1. What is the frequency distribution and range of scores for each of the reading measures?

2. Will there be a change in the percentage of subjects considered to be "masters" of the specific reading skills in the spring compared to those considered "masters" in the fall?

3. Will there be a trend toward decreased skill mastery over the summer?

CHAPTER II

METHOD

Subjects

Nine elementary schools from four northeastern Wisconsin school districts were included in the study. Eight of the schools were located in third class cities while the other school was located in a small village.[1] The largest city had a population of 22,902 while the village population was 1,524. The median number of years of school completed by residents in this geographical area was 12.1 years.[2] Between forty-one and forty-eight percent of the employed persons in the area were blue collar workers while between thirty-nine and fifty-one percent were white collar workers. Approximately ten percent of the adults in this area were employed in governmental positions. The median income was between $10,000 and $11,250 per year while the median home value was $18,000.[3]

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[1] The State of Wisconsin 1971 Blue Book complied by the Wisconsin Legislative Reference Bureau, Madison, Wisconsin.

[2] General Social and Economic Characteristics-Wisconsin. U.S. Department of Commerce, Bureau of the Census, 1970.

[3] Housing Characteristics for State, Cities, and Counties, Vol. I, Part 51, Wisconsin, 1970. U. S. Department of Commerce, Social and Economic Statistics Bureau, Bureau of the Census.

Subjects for the study were 545 first-grade children. This group represented all first graders in the nine elementary schools. Fewer than one percent of the subjects were American Indian, Oriental, Spanish-American, Negro or other minority groups.[4] Approximately one-half of the subjects were enrolled in schools utilizing the objective-based program in grade one; the other one-half had received instruction in basal reading curricula while in first grade (see Table 1).

TABLE 1

SCHOOL DISTRICTS, SCHOOLS, DEMOGRAPHIC CHARACTERISTICS AND READING CURRICULUM OF SCHOOLS PARTICIPATING IN THE STUDY

School District	School	Demographic Characteristics	Reading Curriculum
Hortonville	Hortonville Elementary	Village	Objective-Based
Kaukauna	Nicolet Elementary	Third Class City	Basal Reader
Menasha	Banta Elementary	Third Class City	Basal Reader
Menasha	Clovis Grove Elementary	Third Class City	Basal Reader
Menasha	Gegan Elementary	Third Class City	Basal Reader
Menasha	Jefferson Elementary	Third Class City	Objective-Based
Menasha	Nicolet Elementary	Third Class City	Objective-Based
Neenah	Coolidge Elementary	Third Class City	Objective-Based
Neenah	Hoover Elementary	Third Class City	Objective-Based

[4] Directory of Public Elementary and Secondary Schools in Selected Districts: Enrollment and Staff by Racial/Ethnic Group, Fall, 1970. U.S. Department of Health, Education, and Welfare. Office for Civil Rights.

Instruments

Gates-MacGinitie Reading Test

Overall reading ability was measured by the Vocabulary and Comprehension subtests of the Gates-MacGinitie Reading Test, Primary A, Forms 1 and 2 (Gates-MacGinitie, 1965). This test is a norm-referenced, standardized instrument. Reading ability is assessed in the following manner:

> The Vocabulary Test samples the child's ability to recognize or analyze isolated words. It consists of 48 exercises, each of which contains four printed words and a picture illustrating the meaning of one of the words. The child's task is to circle the word that best corresponds to the picture. The first exercises are composed of easy and commonly used words, grouped with words selected to be only slightly similar or confusing. Gradually the words become less easy and common and are presented with words more similar in details and general appearance.
>
> The Comprehension Test measures the child's ability to read and understand whole sentences and paragraphs. This ability includes many skills not involved in the mere ability to recognize words. The child must grasp the total thought clearly if he is to answer correctly. The test contains 34 passages of increasing length and difficulty. Each passage is accompanied by a panel of four pictures. The child's task is to mark the picture that best illustrates the meaning of the passage or that answers the question in the passage (Gates-MacGinitie, 1965, p. 1).

Alternate form reliabilities between Forms 1 and 2 of the test are .86 for the Vocabulary subtest and .83 for the Comprehension subtest while split-half reliabilities for the two subtests are .91 and .94 respectively.

Wisconsin Tests of Reading Skill Development

Specific reading skills were measured by the Wisconsin Tests of Reading Skill Development-Word Attack (WTRSD-WA), Level B, Forms 1 and 2 (Otto, et al., 1970). The Level B battery was selected for administration since, according to the program guidelines, it was most suitable for administering to fast, average, and slow students at the beginning of second grade. Moreover, this battery is primarily designed for pupils who would be reading at the primer or first reader level.

The Wisconsin Tests of Reading Skill Development are criterion-referenced and are not standardized. The WTRSD-WA measure sight vocabulary, phonic and structural analysis skills. The skills assessed and a brief description of each test at Level B follow:

Test 1-Sight Vocabulary

> For each sentence in Test 1 the test administrator displays a flashcard on which is printed a word from the preprimer and primer levels of the Dolch Basic Word List. Response choices of "yes" or "no" are made to indicate whether these words fit contextually within the given sentences (20 items).

Test 2-Beginning Consonant Sounds

> For the first ten items the child selects from four response choices per item the beginning consonant sound that he hears in dictated nonsense words. With response choices of "yes" and "no" he determines for the remaining ten items whether two dictated nonsense words per item have the same initial consonant (20 items).

Test 3-Ending Consonant Sounds

> For the first ten items the child selects from four response choices per item the ending

consonant sound that he hears in dictated nonsense words. With response choices of "yes" and "no" he determines for the remaining ten items whether two dictated nonsense words per item have the same final consonant (20 items).

Test 4-Consonant Blends

In response to dictated nonsense words the child selects from four response choices per item the blend that he hears in each nonsense word. Blends tested are bl, cl, fl, gl, pl, sl, br, cr, dr, fr, gr, and tr (20 items).

Test 5-Rhyming Elements

Test 5 measures the ability to select from four printed response choices per item the word that rhymes with a printed stimulus word (20 items).

Test 6-Short Vowels

Fifteen items with response choices of a, e, i, o, and u test the child's recognition of the short vowel heard in dictated nonsense words (15 items).

Test 7-Consonant Digraphs

In response to dictated nonsense words the child selects from four response choices per item the digraph that he hears in each nonsense word. Digraphs tested are ch, sh, and th (17 items).

Test 8-Compound Words

The child selects the compound word from three printed response choices read by the test administrator (17 items).

Test 9-Contractions

Test 9 measures the ability to select the correct contraction for use within a given sentence. There are four response choices for each sentence (15 items).

Test 10-Base Words and Endings

The child identifies from three printed response choices the one with the base or root word underlined (12 items).

Test 11-Plurals

> Test 11 measures the child's ability to recognize printed words as representing "one" or "more" than one (12 items).

Test 12-Possessives

> The child selects the phrase containing a possessive from three printed response choices per item read by the test administrator (20 items) (Miles, et al., 1970, p. 3-4).

Alternate form reliabilities of the Level B, Word Attack subtests range from a low of .48 (Test 8-Compound Words) to a high of .83 (Test 7-Consonant Digraphs). Most of the tests have alternate form reliabilities between .70 and .80. Split-half reliabilities for the tests were not available since the technical manual for the instruments had not been produced at the time of testing.

California Short-Form Test of Mental Maturity

The California Short-Form Test of Mental Maturity, Level O, consists of seven subtests which purport to measure four factors (Sullivan, et al., 1963). The seven subtests are (a) Opposites, (b) Similarities, (c) Analogies, (d) Numerical Values, (e) Number Problems, (f) Verbal Comprehension, and (g) Delayed Recall. The seven subtests are grouped to form four factors: Logical Reasoning, Numerical Reasoning, Verbal Concepts, and Memory. When all four factors are combined, a Total Intelligence score is derived.

Curricula

Subjects were divided into two curriculum categories; those receiving objective-based instruction while in first grade and those

instructed in the basal reader curricula. All students who were grouped for instruction on the basis of test results from the Wisconsin Tests of Reading Skill Development-Word Attack were grouped in the objective-based category. Objective-based instruction is designed to give instruction to children when there is a need. Basically, it is a framework for instruction based on four points. First, the identification of essential skills is undertaken. Secondly, specific behavioral objectives are stated for each of the skills. The objectives specify a criterial level used to judge adequacy of performance. Third, criterion-referenced assessment exercises are administered to assist teachers in determining which skills have and which have not been mastered. Pupil performance, then, is evaluated with regard to an absolute or criterion referent. Finally, appropriate teaching/learning activities are identified which permit teachers to organize instruction in line with diagnosed student needs. The salient features of the objective-based curriculum group, then, included:

1. Administering the Wisconsin Tests of Reading Skill Development-Word Attack.

2. Scheduling a minimum of 120 minutes per week for pupil word attack skill development.

3. Forming skill groups on the basis of student need by behavioral objectives.

4. Forming ad hoc word attack skill groups at least every three weeks.

5. At the end of each three-week skill group, reassessing student skill development.

Students enrolled in schools which did not use the Design and which did not group for class instruction on the basis of Wisconsin Tests of Reading Skill Development-Word Attack or other commercially available diagnostic reading test results were categorized as the basal reader curricula subjects. These curricula can be described as:

1. Utilization of a commercially available basal reader and an accompanying workbook of worksheets.
2. The absence of any commercially available objective-based diagnostic word attack testing program.
3. The absence of systematic ad hoc word attack skill grouping as a basis for skill instruction.

The basal reading programs in the nine elementary schools included materials from the following publishers: American Book, Ginn, Harper and Row, Houghton-Mifflin, Lippincott, MacMillan, and Scott Foresman.

Procedure

Initially, the investigator conducted an in-service training program for key personnel in each of the nine elementary schools. The group included school principals, reading teachers, and, in some cases, first-grade teachers. The rationale for the study and the testing procedures which were to be employed were discussed at this time. Participants had an opportunity to become familiar with the tests and the testing schedules to be followed during the investigation. Ample opportunities were also provided for participants to ask questions about the study. Representatives from each of the schools agreed to participate.

The second phase, local staff training for first- and second-grade teachers, was conducted by the school representative who attended the initial in-service training session. The investigator agreed to conduct the local in-service program for all personnel who desired assistance, but only one local staff trainer requested this assistance.

The testing strategy employed required the subjects' regular classroom teacher to administer all the tests. Earlier pilot studies by the investigator showed this procedure to work well with young children. And, because of the large number of subjects to be tested within the course of a week, teachers were in a better position to administer the instruments than was the investigator.

All first-grade teachers in the study administered the Wisconsin Tests of Reading Skill Development-Word Attack, Level B, Form 1, the Gates-MacGinitie Reading Test, Primary A, Forms 1 and 2, and the California Short-Form Test of Mental Maturity two weeks prior to school being dismissed for the summer vacation. Testing was conducted in five sittings, one sitting each day of the week. To reduce the chance of a testing order effect, the schools were randomly assigned to three categories, and the tests were administered according to a randomly derived testing schedule (see Table 2).

The fall testing program was similar to the spring testing schedule. Primarily, the major differences were (a) all testing was done by the second-grade teachers, (b) the California-Short Form Test of Mental Maturity was not readministered, and (c) Form 2 of the Wisconsin Tests of Reading Skill Development, Level B, was administered. The fall testing program was conducted the second full week of school in each of the

TABLE 2

SPRING TEST ADMINISTRATION SCHEDULE

Sitting and Test	Schools and Testing Order		
	Gegan Coolidge* Hoover	Banta* Jefferson Nicolet/ Menasha*	Nicolet/ Kaukauna Clovis Grove Hortonville*
Sitting A			
Gates-MacGinitie Reading Test- Primary A, Form 1 (40 Minutes)	4	4	2
Sitting B			
California Short-Form Test of Mental Maturity (34 Minutes)	2	3	1
Sitting C			
WTRSD-WA, Level B, Form 1 Tests 1, 3, 4, 5 (50 Minutes)	3	1	5
Sitting D			
WTRSD-WA, Level B, Form 1 Tests 6, 7, 8, 9 (40 Minutes)	1	2	3
Sitting E			
WTRSD-WA, Level B, Form 1 Tests 10, 11, 12, 13 (35 Minutes)	5	5	4

*Schools administering Form 2 of the Gates-MacGinitie Reading Test- Primary A

respective districts. Again, the testing order for administering the tests was derived randomly (see Table 3).

Analysis

Upon completion of the spring and fall testing programs, all tests were delivered to the investigator. Gates-MacGinitie Reading Tests, the California Short-Form Test of Mental Maturity, and the Wisconsin Tests of Reading Skill Development, Level B, Form 2, were hand-scored by a staff of four individuals hired by the investigator. The investigator spot-checked randomly, as the tests were being scored, in order to check for a high degree of scoring accuracy. The Wisconsin Tests of Reading Skill Development, Level B, Form 1, were machine scored with the computer scoring service provided by the printer of the materials, National Computer Systems.

All raw test data was coded on eighty field, twenty-five subject coding sheets. The coding was done by two individuals trained by the investigator; one of whom was a student enrolled in the Computer Sciences program at the University of Wisconsin-Madison, the other a full-time University secretary.

Coded test data were key punched by two qualified, full-time University of Wisconsin-Madison key punchers. All of the data were verified for key punching accuracy.

The computer program was written by a computer programmer employed at the Wisconsin Research and Development Center for Cognitive Learning. A multiple analysis of variance program and descriptive

TABLE 3

FALL TEST ADMINISTRATION SCHEDULE

Sitting and Test	Schools and Testing Order		
	Gegan Coolidge* Hoover	Banta* Jefferson Nicolet/ Menasha*	Nicolet/ Kaukauna Clovis Grove Hortonville*
Sitting A			
Gates-MacGinitie Reading Test- Primary A, Form 2 (40 Minutes)	1	3	4
Sitting C			
WTRSD-WA, Level B, Form 2 Tests 1, 3, 4, 5 (50 Minutes)	2	2	1
Sitting D			
WTRSD-WA, Level B, Form 2 Tests 6, 7, 8, 9 (40 Minutes)	3	1	2
Sitting E			
WTRSD-WA, Level B, Form 2 Tests 10, 11, 12, 13 (35 Minutes)	4	4	2

*Schools administering Form 1 of the Gates-MacGinitie Reading Test- Primary A

statistics were used to analyze the data. Only subjects for which complete data were available were included in the analysis. In addition, to determine if intelligence of subjects had an effect on retention of overall reading ability or specific reading skills, subjects in the third- and seventh stanines on the California Short-Form Test of Mental Maturity were not included in the analysis of the data. Eliminating these subjects permitted three distinct intelligence groups, each separated from one another by one stanine. By excluding the third- and seventh-stanine subjects from the analysis and excluding subjects for which complete data were not available, a final sample of 311 subjects remained.

In summary, then, to determine the degree of retention, mean spring-fall test scores of all subjects were compared. This was the dependent variable. Sex of subject, intelligence, and school curriculum were also examined in an attempt to determine whether these three variables influenced the ability of subjects to retain overall reading ability or reading skills. These three factors were considered to be the independent variables. A 2 x 3 x 2 factorial design using the multivariate analysis of variance statistics technique was used to determine whether a relationship existed between the variables. The factorial table for the study is found in Appendix A.

CHAPTER III

FINDINGS

In this chapter, the differences in spring and fall reading test scores of males and females, between subjects of below-average, average, and above-average intellectual ability, and between subjects enrolled in the two reading curriculum categories are examined. Results from each of the tests will be discussed in terms of changes in the mean raw scores and the significance of the changes. Descriptive information pertaining to the frequency and range of scores will be provided. Changes in the number and percentage of subjects considered to have mastered the specific reading skills between the spring and fall will also be discussed. In addition, histograms illustrating the trend in the changes of scores will be shown throughout the chapter.

The purpose of this chapter is to provide the reader with the relevant data to illustrate the nature of changes in reading scores over the summer vacation period. These data will enable the reader to understand better the effect the non-instructional summer period has on reading test scores. The data are discussed and the conclusions are examined in Chapter IV.

Retention of Overall Reading Ability

Gates-MacGinitie Reading Test-Vocabulary

The range of reading scores on the Vocabulary subtest of the Gates-MacGinitie Reading Test was thirty-six raw score points on the spring test and forty-four raw score points on the fall test (see Table 4). Thus, the range of scores on the fall test was eight points greater than on the spring test. Few subjects achieved a score of fifteen or less on either the spring or fall test. Instead, the trend was in the opposite direction as illustrated by the fact that over one-half of the subjects achieved a score of forty or more on both tests.

The change between the mean spring and fall scores amounted to a loss of 1.35 raw score points (see Table 5). The analysis of variance treatment with one degree of freedom revealed that the loss between spring and fall was significant at the .001 level (see Table 6). To determine whether sex of subject, intelligence, and the type of school reading curriculum were related to retention of the Vocabulary measure, another analysis of variance treatment was performed. None of the independent variables was found to be a significant factor affecting the retention ability of first-grade subjects (see Table 7).

Figure 1 illustrates the large differences between spring and fall tests for a number of the subjects. One person, for example, had a difference of forty points between his spring and fall test scores. Most of the change scores were not this great, however.

TABLE 4

FREQUENCY DISTRIBUTION OF GATES-MACGINITIE
READING TEST, PRIMARY A, VOCABULARY TEST SCORES (N=313*)

Raw Score	Spring	Fall	Raw Score	Spring	Fall
0	—	—	25	2	3
1	—	—	26	4	6
2	—	—	27	6	6
3	—	—	28	4	5
4	—	1	29	4	14
5	—	—	30	6	2
6	—	—	31	7	8
7	—	—	32	8	7
8	—	—	33	7	10
9	—	—	34	7	7
10	—	—	35	9	8
11	—	1	36	12	8
12	1	—	37	9	8
13	—	1	38	9	5
14	—	1	39	9	6
15	—	2	40	18	3
16	1	—	41	18	16
17	1	2	42	6	13
18	—	3	43	12	16
19	3	4	44	14	17
20	1	2	45	22	18
21	4	2	46	22	31
22	-	4	47	38	24
23	2	5	48	41	41
24	5	2			

*Data in all frequency distribution tables based on 313 subjects; two students failed to have a Total Intelligence stanine score but had taken the entire battery. All statistical tests for significance were based on 311 subjects, however.

TABLE 5

MEAN SPRING AND FALL TEST SCORES, CHANGE SCORES, AND STANDARD DEVIATIONS FOR OVERALL READING ABILITY AND SPECIFIC READING SKILL ABILITY

Variable	Mean	S.D.
Gates-MacGinitie-Voc. -- Spring	39.72	7.91
Gates-MacGinitie-Voc. -- Fall	38.37	9.28
Gates-MacGinitie-Voc. -- Change	- 1.35	--
Gates-MacGinitie-Comp. -- Spring	23.60	7.34
Gates-MacGinitie-Comp. -- Fall	22.80	8.26
Gates-MacGinitie-Comp. -- Change	- .80	--
WTRSD-Sight Vocabulary -- Spring	17.59	2.47
WTRSD-Sight Vocabulary -- Fall	16.55	3.02
WTRSD-Sight Vocabulary -- Change	- 1.04	--
WTRSD-Beginning Cons. -- Spring	18.31	2.21
WTRSD-Beginning Cons. -- Fall	17.69	2.33
WTRSD-Beginning Cons. -- Change	- .62	--
WTRSD-Ending Cons. -- Spring	17.60	2.62
WTRSD-Ending Cons. -- Fall	16.67	3.37
WTRSD-Ending Cons. -- Change	- .93	--
WTRSD-Cons. Blends -- Spring	17.19	3.62
WTRSD-Cons. Blends -- Fall	16.10	4.13
WTRSD-Cons. Blends -- Change	- 1.09	--
WTRSD-Rhyming Elements -- Spring	16.79	4.78
WTRSD-Rhyming Elements -- Fall	14.87	5.87
WTRSD-Rhyming Elements -- Change	- 1.92	--

C O N T I N U E D

CONTINUED

TABLE 5

MEAN SPRING AND FALL TEST SCORES, CHANGE SCORES, AND STANDARD DEVIATIONS FOR OVERALL READING ABILITY AND SPECIFIC READING SKILL ABILITY

Variable		Mean	S.D.
WTRSD-Short Vowels	-- Spring	11.28	4.11
WTRSD-Short Vowels	-- Fall	10.65	4.03
WTRSD-Short Vowels	-- Change	- .63	--
WTRSD-Cons. Digraphs	-- Spring	13.62	4.20
WTRSD-Cons. Digraphs	-- Fall	11.98	4.47
WTRSD-Cons. Digraphs	-- Change	- 1.64	--
WTRSD-Compound Words	-- Spring	13.77	3.16
WTRSD-Compound Words	-- Fall	13.17	3.58
WTRSD-Compound Words	-- Change	- .60	--
WTRSD-Contractions	-- Spring	10.77	4.15
WTRSD-Contractions	-- Fall	9.58	4.37
WTRSD-Contractions	-- Change	- 1.19	--
WTRSD-Base Words	-- Spring	8.74	3.06
WTRSD-Base Words	-- Fall	8.95	3.00
WTRSD-Base Words	-- Change	+ .21	--
WTRSD-Plurals	-- Spring	10.51	1.75
WTRSD-Plurals	-- Fall	10.46	2.26
WTRSD-Plurals	-- Change	- .05	--
WTRSD-Possessives	-- Spring	17.05	4.13
WTRSD-Possessives	-- Fall	17.23	3.91
WTRSD-Possessives	-- Change	+ .18	--

TABLE 6

SUMMARY OF ANALYSIS OF VARIANCE OF CHANGE SCORES

Variable	df	Mean Squares	Univariate F	P
Gates-MacGinitie-Voc.	1	569.91	12.98	<.001
Gates-MacGinitie-Comp.	1	182.14	7.59	<.01
WTRSD-Sight Voc.	1	335.46	54.00	<.0001
WTRSD-Beginning Cons.	1	118.53	23.57	<.0001
WTRSD-Ending Cons.	1	274.16	31.27	<.0001
WTRSD-Cons. Blends	1	373.90	35.32	<.0001
WTRSD-Rhyming Elem.	1	1180.82	53.85	<.0001
WTRSD-Short Vowels	1	126.06	20.77	<.0001
WTRSD-Cons. Digraphs	1	842.91	119.84	<.0001
WTRSD-Compound Words	1	117.30	11.80	<.001
WTRSD-Contractions	1	449.76	41.42	<.0001
WTRSD-Base Words	1	11.96	1.23	NS
WTRSD-Plurals	1	.46	.09	NS
WTRSD-Possessives	1	8.36	.90	NS

TABLE 7

DIFFERENCE IN MEAN SPRING AND FALL TEST SCORES BY SEX, IQ, AND SCHOOL READING CURRICULUM CATEGORIES[1]

Variable	Sex		Intelligence			Curriculum	
	Males (N=153)	Females (N=158)	Below-Ave. (N=10)	Ave. (N=138)	Above-Ave. (N=163)	Basal Reader (N=51)	Objective-Based (N=260)
Gates-MacGinitie-Voc.	-1.84	- .89	- .40	-1.69	-1.13	- .84	-1.45
Gates-MacGinitie-Comp.	-1.57	.01	- .70	- .88	- .67	- .02	- .91
WTRSD-Sight Voc.	-1.41	- .68	-1.30	-1.28	- .82	- .45	-1.15
WTRSD-Beginning Cons.	- .54	- .70	.20	- .70	- .60	- .14	- .71
WTRSD-Ending Cons.	-1.09	- .80	-2.30	- .99	- .82	-1.18	- .89
WTRSD-Cons. Blends	-1.30	- .90	-3.00	-1.17	- .92	- .43	-1.23
WTRSD-Rhyming Elem.	-2.25	-1.65	-1.90	-3.01**	-1.05[a]	-1.57	-2.02
WTRSD-Short Vowels	- .73	- .54	.70	- .57	- .77	- .90	- .58
WTRSD-Cons. Digraphs	-1.80	-1.5	.00[b]	-2.02*	-1.42	-1.49	-1.68
WTRSD-Compound Words	- .73	- .51	-1.20	- .99	- .26	- .31	- .67
WTRSD-Contractions	-1.43	- .98	- .30	-1.46	-1.04	-1.27	-1.19
WTRSD-Base Words	- .21	.59	2.00	- .10	.33	.88	.06
WTRSD-Plurals	- .10	.02	-1.00	.00	- .01	.22	- .09
WTRSD-Possessives	.29	.04	-1.10	.09	.31	1.37	- .07

*p<.05
**p<.01

[a]Post hoc Scheffe procedure to determine significance between Average and Above-Average groups

[b]Post hoc Scheffe procedure to determine significance between Below-Average and Average groups

[1]ANOVA Tables can be found in the Appendix

Figure 1

Changes in Raw Scores on the Gates-MacGinitie Reading Test, Primary A, Vocabulary

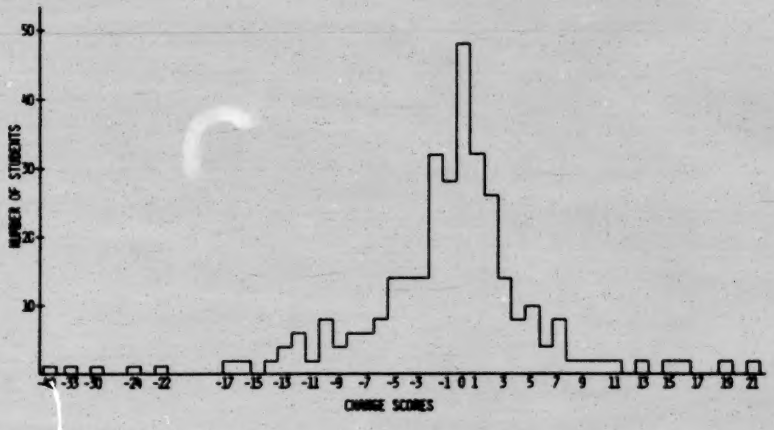
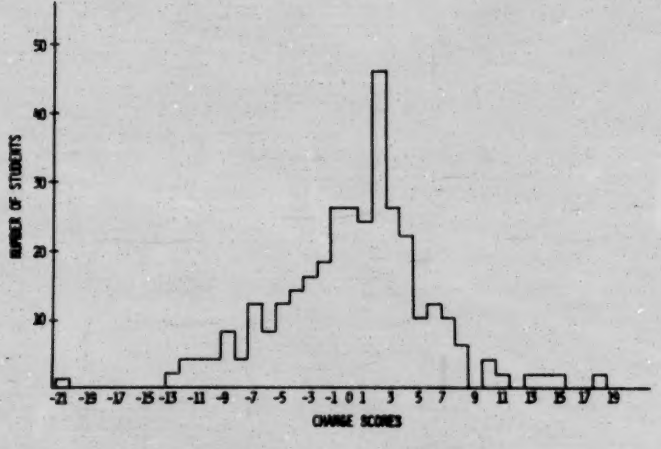


Figure 2

Changes in Raw Scores on the Gates-MacGinitie Reading Test, Primary A, Comprehension



Gates-MacGinitie Reading Test-Comprehension

The range of scores for the Comprehension portion of the Gates-MacGinitie test followed a pattern similar to that of the Vocabulary measure. That is, the range of scores in the fall was greater than in the spring (see Table 8). The low spring score was seven; the low fall score, four. The high score for both the spring and fall tests was thirty-four points.

Like the Vocabulary measure, the fall mean score was lower than the spring test score (see Table 5). While the loss was less than one raw score point, it was still significant at the .01 level of confidence (see Table 6). Sex of subject, intellectual ability, and type of school curriculum, however, were not found to be significantly related to retention of comprehension ability (see Table 7).

The differences between subjects' spring and fall test scores were not as widely distributed on the Comprehension measure as they were on the Vocabulary test (see Figure 2). Most of the changes were within a gain or loss of eight points or less.

Retention of Specific Reading Skills

WTRSD-Sight Vocabulary

The range of scores on the measure of sight vocabulary was greater in the fall than in the spring (see Table 9). The low and high scores for the spring and fall were 6-20 and 1-20 respectively, the range being five points greater for the fall. The range for the fall test is somewhat misleading, however, since only one subject received

TABLE 8

FREQUENCY DISTRIBUTION OF GATES-MACGINITIE
READING TEST, PRIMARY A, COMPREHENSION TEST SCORES

Raw Score	Spring	Fall	Raw Score	Spring	Fall
0	--	--	18	15	17
1	--	--	19	12	11
2	--	--	20	11	15
3	--	--	21	21	8
4	--	1	22	14	10
5	--	2	23	9	8
6	--	2	24	13	15
7	1	5	25	13	6
8	2	3	26	8	3
9	3	5	27	8	9
10	2	2	28	11	6
11	7	8	29	12	18
12	11	14	30	15	15
13	6	9	31	20	14
14	9	13	32	28	13
15	18	7	33	23	29
16	4	12	34	12	24
17	15	9			

TABLE 9

FREQUENCY DISTRIBUTION OF WTRSD-
SIGHT VOCABULARY TEST SCORES

Raw Score	Spring	Fall
0	--	1
1	--	--
2	--	--
3	--	--
4	--	--
5	--	--
6	1	1
7	1	4
8	--	1
9	1	5
10	1	4
11	5	4
12	7	12
13	9	8
14	13	25
15	16	25
16	23	34
17	35	35
18	52	65
19	84	54
20	65	35

a score of one when school resumed. Almost one-half of the subjects received perfect scores or missed only one item on the spring test while approximately thirty percent of the subjects achieved this well in the fall.

The raw score change between the mean spring and mean fall tests was -1.04 which was highly significant at the .0001 level of confidence (see Table 6). There was no significant difference between scores of males and females, between groups of different intellectual ability, or between subjects in the objective-based and basal reader groups (see Table 7).

In an attempt to determine whether the difference between spring and fall test scores had any pedagogical significance, the number and percentage of subjects who were classified as "masters" (achieving a score of eighty percent correct or higher on a specific skill test) versus "nonmasters" (a score of less than eighty percent correct) was compared (see Tables 10-13, pp. 39-42). Generally, in the objective-based group, about twenty to thirty percent fewer males could be considered "masters" in the fall, while only between eight and sixteen percent fewer of the females could be considered "masters." In the basal reader group, as many as forty-two percent of the males needed to be reclassified from "masters" to "nonmasters." The percentage of females changing from "masters" to "nonmasters" in the basal reader group was about the same in number as their objective-based, female, peers. A histogram illustrates that most of the changing of scores between spring and fall fell within the -3 and +1 parameters (see Figure 3, p. 48).

TABLE 10

NUMBER AND PERCENTAGE OF MALE SUBJECTS, BY IQ GROUP, IN THE OBJECTIVE-BASED CURRICULUM ACHIEVING MASTERY OR NONMASTERY ON SPECIFIC WTRSD*

Variable	Below-Ave. Males (N=1)				Average Males (N=65)				Above-Ave. Males (N=63)			
	Spring		Fall		Spring		Fall		Spring		Fall	
	M	NM	M	NM	M	NM	M	NM	M	NM	M	NM
Sight Vocab.	0 (0)	1 (100)	0 (0)	1 (100)	38 (58)	27 (42)	18 (28)	47 (72)	56 (89)	7 (11)	44 (70)	19 (30)
Beg. Cons.	0 (0)	1 (100)	1 (100)	0 (0)	44 (68)	21 (32)	34 (52)	31 (48)	59 (94)	4 (6)	56 (89)	7 (11)
Ending Cons.	0 (0)	1 (100)	1 (100)	0 (0)	37 (57)	28 (43)	33 (51)	32 (49)	56 (89)	7 (11)	43 (68)	20 (32)
Cons. Blends	0 (0)	1 (100)	0 (0)	1 (100)	32 (49)	33 (51)	17 (26)	48 (74)	55 (87)	8 (13)	40 (63)	23 (37)
Rhyming Elem.	1 (100)	0 (0)	0 (0)	1 (100)	39 (60)	26 (40)	27 (42)	38 (58)	54 (86)	9 (14)	43 (68)	20 (32)
Short Vowels	0 (0)	1 (100)	0 (0)	1 (100)	26 (40)	39 (60)	18 (28)	47 (72)	47 (75)	16 (25)	40 (63)	23 (37)
Cons. Digraphs	0 (0)	1 (100)	0 (0)	1 (100)	22 (34)	43 (66)	12 (18)	53 (82)	46 (73)	17 (27)	32 (51)	31 (49)
Comp. Words	0 (0)	1 (100)	1 (100)	0 (0)	25 (38)	40 (62)	14 (22)	51 (78)	38 (60)	25 (40)	41 (65)	22 (35)
Contractions	0 (0)	1 (100)	0 (0)	1 (100)	16 (25)	49 (75)	9 (14)	56 (86)	42 (67)	21 (33)	28 (44)	35 (56)
Base Words	0 (0)	1 (100)	0 (0)	1 (100)	16 (25)	49 (75)	16 (25)	49 (75)	31 (49)	32 (51)	32 (51)	31 (49)
Plurals	0 (0)	1 (100)	0 (0)	1 (100)	38 (58)	26 (42)	39 (60)	25 (40)	48 (76)	15 (24)	49 (78)	14 (22)
Possessives	1 (100)	0 (0)	0 (0)	1 (100)	33 (51)	32 (49)	38 (58)	27 (42)	58 (92)	5 (8)	62 (98)	1 (2)

*Percentages indicated in parentheses

TABLE 11

NUMBER AND PERCENTAGE OF FEMALE SUBJECTS, BY IQ GROUP, IN THE OBJECTIVE-BASED CURRICULUM ACHIEVING MASTERY OR NONMASTERY ON SPECIFIC WTRSD*

Variable	Below-Ave. Females (N=9)				Average Females (N=55)				Above-Ave. Females (N=67)			
	Spring		Fall		Spring		Fall		Spring		Fall	
	M	NM	M	NM	M	NM	M	NM	M	NM	M	NM
Sight Vocab.	2 (22)	7 (78)	2 (22)	7 (78)	38 (69)	17 (31)	29 (53)	26 (47)	63 (94)	4 (6)	57 (85)	10 (15)
Beg. Cons.	4 (44)	5 (56)	3 (33)	6 (67)	43 (78)	12 (22)	39 (71)	16 (29)	66 (99)	1 (1)	60 (90)	7 (10)
Ending Cons.	4 (44)	5 (56)	4 (44)	5 (56)	36 (65)	19 (35)	27 (49)	28 (51)	62 (93)	5 (7)	58 (87)	9 (13)
Cons. Blends	3 (33)	6 (67)	2 (22)	7 (78)	37 (67)	18 (33)	28 (51)	27 (49)	63 (94)	4 (6)	57 (85)	10 (15)
Rhyming Elem.	5 (56)	4 (44)	3 (33)	6 (67)	37 (67)	18 (33)	23 (42)	32 (58)	59 (88)	8 (12)	54 (81)	13 (19)
Short Vowels	1 (11)	8 (89)	2 (22)	7 (78)	25 (45)	30 (55)	17 (31)	38 (69)	52 (78)	15 (22)	41 (61)	26 (39)
Cons. Digraphs	2 (22)	7 (78)	1 (11)	8 (89)	23 (42)	32 (58)	12 (22)	43 (78)	61 (91)	6 (9)	47 (70)	20 (30)
Comp. Words	1 (11)	8 (89)	1 (11)	8 (89)	28 (51)	27 (49)	18 (33)	37 (67)	51 (76)	16 (24)	50 (75)	17 (25)
Contractions	0 (0)	9 (100)	0 (0)	9 (100)	21 (38)	34 (62)	14 (25)	41 (75)	52 (78)	15 (22)	43 (64)	24 (36)
Base Words	0 (0)	9 (100)	2 (22)	7 (78)	20 (36)	35 (64)	15 (27)	40 (73)	38 (57)	29 (43)	44 (66)	23 (34)
Plurals	5 (56)	4 (44)	3 (33)	6 (67)	38 (69)	17 (31)	37 (67)	18 (33)	56 (84)	11 (16)	54 (81)	13 (19)
Possessives	2 (22)	7 (78)	2 (22)	7 (78)	36 (65)	19 (35)	33 (60)	22 (40)	65 (97)	2 (3)	61 (91)	6 (9)

*Percentages indicated in parentheses

TABLE 12

NUMBER AND PERCENTAGE OF MALE SUBJECTS, BY IQ GROUP, IN THE BASAL READER CURRICULA ACHIEVING MASTERY OR NONMASTERY ON SPECIFIC WTRSD*

Variable	Below-Ave. Males (N=0)				Average Males (N=12)				Above-Ave. Males (N=12)			
	Spring		Fall		Spring		Fall		Spring		Fall	
	M	NM	M	NM	M	NM	M	NM	M	NM	M	NM
Sight Vocab.	- (-)	- (-)	- (-)	- (-)	3 (25)	9 (75)	4 (33)	8 (67)	10 (83)	2 (17)	8 (67)	4 (33)
Beg. Cons.	- (-)	- (-)	- (-)	- (-)	7 (58)	5 (42)	10 (83)	2 (17)	11 (92)	1 (8)	11 (92)	1 (8)
Ending Cons.	- (-)	- (-)	- (-)	- (-)	7 (58)	5 (42)	5 (42)	7 (58)	9 (75)	3 (25)	8 (67)	4 (33)
Cons. Blends	- (-)	- (-)	- (-)	- (-)	8 (67)	4 (33)	7 (58)	5 (42)	10 (83)	2 (17)	8 (67)	4 (33)
Rhyming Elem.	- (-)	- (-)	- (-)	- (-)	2 (17)	10 (83)	1 (8)	11 (92)	5 (42)	7 (58)	8 (67)	4 (33)
Short Vowels	- (-)	- (-)	- (-)	- (-)	3 (25)	9 (75)	4 (33)	8 (67)	6 (50)	6 (50)	5 (42)	7 (58)
Cons. Digraphs	- (-)	- (-)	- (-)	- (-)	6 (50)	6 (50)	2 (17)	10 (83)	8 (67)	4 (33)	4 (33)	8 (67)
Comp. Words	- (-)	- (-)	- (-)	- (-)	2 (17)	10 (83)	3 (25)	9 (75)	8 (67)	4 (33)	8 (67)	4 (33)
Contractions	- (-)	- (-)	- (-)	- (-)	3 (25)	9 (75)	1 (8)	11 (92)	6 (50)	6 (50)	3 (25)	9 (75)
Base Words	- (-)	- (-)	- (-)	- (-)	0 (0)	12(100)	1 (8)	11 (92)	5 (42)	7 (58)	5 (42)	7 (58)
Plurals	- (-)	- (-)	- (-)	- (-)	5 (42)	7 (58)	7 (58)	5 (42)	10 (83)	2 (17)	10 (83)	2 (17)
Possessives	- (-)	- (-)	- (-)	- (-)	3 (25)	9 (75)	5 (42)	7 (58)	8 (67)	4 (33)	9 (75)	3 (25)

*Percentages indicated in parentheses

TABLE 13

NUMBER AND PERCENTAGE OF FEMALE SUBJECTS, BY IQ GROUP, IN THE BASAL READER CURRICULA ACHIEVING MASTERY OR NONMASTERY ON SPECIFIC WTRSD*

Variable	Below-Ave. Females (N=0)				Average Females (N=6)				Above-Ave. Females (N=21)			
	Spring		Fall		Spring		Fall		Spring		Fall	
	M	NM	M	NM	M	NM	M	NM	M	NM	M	NM
Sight Vocab.	- (-)	- (-)	- (-)	- (-)	4 (67)	2 (33)	4 (67)	2 (33)	20 (95)	1 (5)	21(100)	0 (0)
Beg. Cons.	- (-)	- (-)	- (-)	- (-)	6 (100)	0 (0)	5 (83)	1 (17)	21(100)	0 (0)	19 (91)	2 (9)
Ending Cons.	- (-)	- (-)	- (-)	- (-)	4 (67)	2 (33)	4 (67)	2 (33)	21(100)	0 (0)	19 (91)	2 (9)
Cons. Blends	- (-)	- (-)	- (-)	- (-)	5 (83)	1 (17)	4 (67)	2 (33)	20 (95)	1 (5)	19 (91)	2 (9)
Rhyming Elem.	- (-)	- (-)	- (-)	- (-)	3 (50)	3 (50)	2 (33)	4 (67)	16 (76)	5 (24)	17 (81)	4 (19)
Short Vowels	- (-)	- (-)	- (-)	- (-)	1 (17)	5 (83)	2 (33)	4 (67)	9 (43)	12 (57)	7 (33)	14 (67)
Cons. Digraphs	- (-)	- (-)	- (-)	- (-)	2 (33)	4 (67)	0 (0)	6 (100)	17 (81)	4 (19)	15 (71)	6 (29)
Comp. Words	- (-)	- (-)	- (-)	- (-)	2 (33)	4 (67)	1 (17)	5 (83)	15 (71)	6 (29)	14 (67)	7 (33)
Contractions	- (-)	- (-)	- (-)	- (-)	2 (33)	4 (67)	0 (0)	6 (100)	13 (62)	8 (38)	12 (57)	9 (43)
Base Words	- (-)	- (-)	- (-)	- (-)	0 (0)	6 (100)	0 (0)	6 (100)	8 (38)	13 (62)	13 (57)	9 (43)
Plurals	- (-)	- (-)	- (-)	- (-)	3 (50)	3 (50)	4 (33)	2 (67)	12 (57)	9 (43)	17 (81)	4 (19)
Possessives	- (-)	- (-)	- (-)	- (-)	1 (17)	5 (83)	2 (67)	4 (33)	19 (90)	2 (10)	18 (86)	3 (14)

*Percentages indicated in parentheses

WTRSD-Beginning Consonants

The low and high scores on this test were the same for both spring and fall (low = 7, high = 20). The range was thirteen raw score points (see Table 14). Over two-thirds of the subjects scored eighteen points or higher on both the spring and fall tests.

The mean raw score change between the two tests was -.62 which was significant at the .0001 level, the same as the Sight Vocabulary test (see Table 6). Sex of subject, IQ, and school curriculum were not significant factors affecting retention (see Table 7).

A higher percentage of subjects was categorized as "masters" on this test than on any other measure (see Table 11). And, the percentage of average ability males in the basal reader group that needed to be reclassified as "masters" in the fall actually increased by twenty-five percent (see Table 12). Generally, however, there was relatively little change in the percentage of "masters" between spring and fall in either curriculum category.

The general stability of scores can be seen by examining Figure 4, p. 48. Almost all of the changes in scores occurred between -2 and +2.

WTRSD-Ending Consonants

The low score for the Ending Consonants test was six points in the spring and five points in the fall (see Table 15, p. 45). High scores of twenty were reached for both spring and fall tests.

While a loss of slightly under one point resulted when the two mean scores were compared, it was statistically significant at the

TABLE 14

FREQUENCY DISTRIBUTION OF WTRSD-
BEGINNING CONSONANTS TEST SCORES

Raw Score	Spring	Fall
0	—	--
1	--	--
2	—	--
3	--	--
4	—	--
5	--	--
6	--	--
7	1	1
8	1	1
9	1	--
10	2	5
11	3	4
12	3	1
13	3	7
14	9	8
15	13	18
16	14	28
17	20	36
18	43	57
19	81	83
20	119	64

TABLE 15

FREQUENCY DISTRIBUTION OF WTRSD-
ENDING CONSONANTS TEST SCORES

Raw Score	Spring	Fall
0	--	--
1	--	--
2	--	--
3	--	--
4	--	--
5	--	2
6	1	4
7	1	3
8	2	5
9	--	4
10	4	7
11	3	5
12	5	7
13	9	9
14	19	12
15	13	20
16	18	31
17	35	43
18	49	50
19	76	54
20	78	57

.0001 level. Sex, IQ, and school curriculum, however, did not have significant effects on retention ability (see Table 7).

The largest loss from "mastery" to "nonmastery" occurred in above-average, objective-based program males where twenty-one percent fewer subjects were considered to be "masters" in the fall (see Table 10).

Most subjects had change scores which were generally in the -3 to +1 range (see Figure 5, p. 48).

WTRSD-Consonant Blends

Identical low and high spring and fall test scores were found on this measure. A score of three was the low while a score of twenty was the high (see Table 16, p. 47).

The difference between the spring and fall mean test scores resulted in a loss of more than one point (see Table 5). Again, this loss was significant at the .0001 level of confidence (see Table 6). And, again, sex of subject, IQ, and school curriculum were not found to be significantly related to retention ability (see Table 7).

Like all of the previous specific skill tests, most of the above-average intelligence group subjects were identified as "masters" (see Tables 10-13). Interestingly, subjects taught with basal readers were not as prone to be recategorized as were objective-based curriculum subjects. This was true for females as well as males. While almost twenty-five percent of objective-based curriculum males went from the "mastery" to "nonmastery" category, only about twelve percent of the basal reader group males changed categories. Moreover, only about

TABLE 16

FREQUENCY DISTRIBUTION OF WTRSD-
CONSONANT BLENDS TEST SCORES

Raw Score	Spring	Fall
0	--	--
1	--	--
2	--	--
3	1	2
4	2	3
5	2	6
6	3	4
7	7	3
8	1	8
9	5	5
10	6	8
11	2	4
12	5	8
13	6	16
14	7	19
15	14	13
16	17	30
17	31	28
18	44	34
19	79	61
20	81	61

Figure 3

Changes in Raw Scores on the
WTRSD-Sight Vocabulary

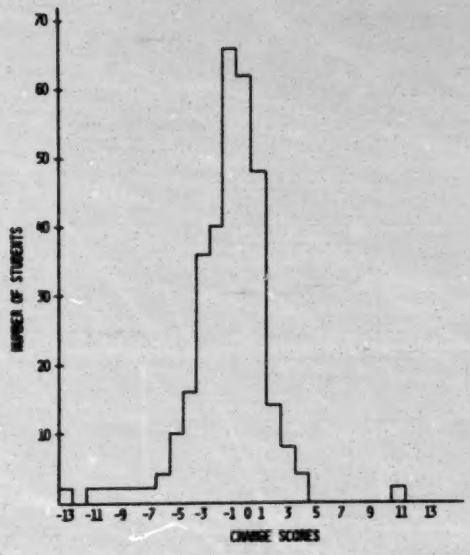


Figure 4

Changes in Raw Scores on the
WTRSD-Beginning Consonants

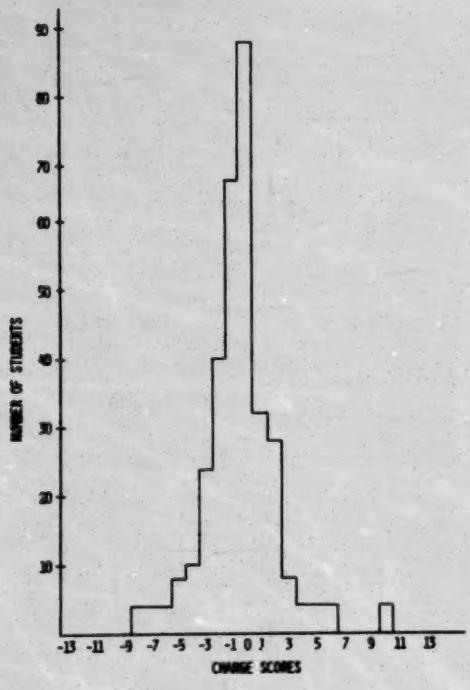


Figure 5

Changes in Raw Scores on the
WTRSD-Ending Consonants

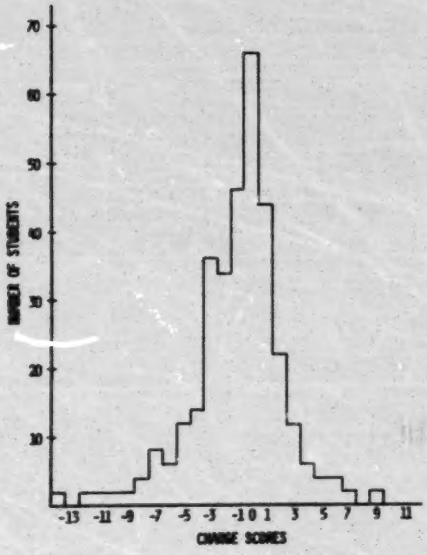
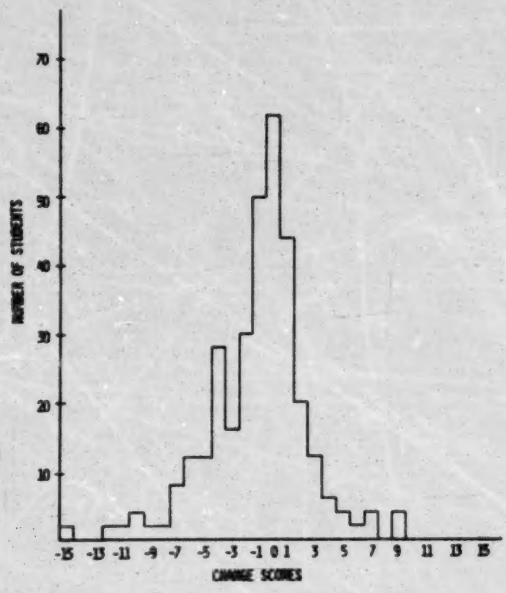


Figure 6

Changes in Raw Scores on the
WTRSD-Consonant Blends



five percent of the above-average, basal reader group females changed categories.

Most of the changes in subjects' scores between spring and fall were between the -2 and +1 categories (see Figure 6).

WTRSD-Rhyming Elements

The Rhyming Elements test was the specific skill measure on which the greatest range of scores was found. Both the spring and the fall results indicated low scores of zero and high scores of twenty. Interestingly, over one-third of all subjects made perfect scores during the spring test (see Table 17, p. 50).

The Rhyming Elements test was also the test on which the greatest change score was found. The mean spring score of 16.79 and the fall score of 14.87 resulted in a change score of -1.92. As might be expected, since this change of scores was the largest difference found between any of the tests, it resulted in a highly significant loss at the .0001 level of confidence (see Table 6). Sex of subject and curriculum group were not found to be related to retention of test scores. The average IQ group was found to have a significantly greater ($df = 2$, $MS = 133.86$, $F = 6.10$, $p < .01$) mean loss than the above-average IQ group, however (see Table 7).

The percentage of male and female masters in the basal reader group was relatively low when compared with other specific reading skill test "masters" (see Tables 12 and 13). There was a twenty-five percent change from "nonmastery" to the "mastery" category for above-average, basal reader males, however.

TABLE 17

FREQUENCY DISTRIBUTION OF WTRSD-
RHYMING ELEMENTS TEST SCORES

Raw Score	Spring	Fall
0	2	5
1	—	3
2	5	5
3	3	3
4	2	6
5	2	17
6	6	5
7	2	9
8	9	9
9	5	12
10	4	4
11	6	5
12	5	6
13	10	7
14	6	10
15	10	16
16	15	13
17	15	20
18	21	24
19	51	49
20	134	85

The distribution of change scores was also interesting to examine. Almost one-third of the subjects' did not change between spring and fall (see Figure 7, p. 57). A number of subjects, nevertheless, experienced losses of eight and more raw score points.

WTRSD-Short Vowels

A low score of one and a high of fifteen were recorded on the spring test while scores of zero and fifteen marked the low and high parameters for the fall test. A large number of subjects fell within the five-to-ten items correct range on this measure (see Table 18).

The loss between the mean spring and fall tests was -.63, slightly more than one-half of a full raw score point (see Table 5). Even so, this was still enough to result in a significant loss at the .0001 level (see Table 6). While there was a loss between the spring and fall mean scores, there was no significant difference in retention ability between subjects of different sexes, intellectual ability, or between types of school reading curriculum (see Table 7).

Generally, there was a smaller percentage of fall "masters" than spring "masters" with the exception of below-average intelligence females enrolled in the objective-based program (see Table 11) and average intelligence males in the basal reader curricula (see Table 12). The increase was slight, however.

Approximately one-third of the subjects' scores did not change between spring and fall. And, when a change did occur, it was usually either a gain or loss of only one raw score point (see Figure 8, p. 57).

TABLE 18

FREQUENCY DISTRIBUTION OF WTRSD-
SHORT VOWELS TEST SCORES

Raw Score	Spring	Fall
0	--	1
1	3	1
2	8	10
3	8	9
4	14	13
5	12	17
6	16	11
7	8	14
8	8	13
9	10	20
10	18	15
11	14	22
12	24	31
13	30	37
14	47	31
15	93	68

WTRSD-Consonant Digraphs

The ranges of scores on the spring and fall tests were almost identical. On the spring test, one person failed to score while a large number of subjects achieved a perfect score of seventeen. While the range of scores was slightly lower for the fall test (1-17), there was a noticeable shift downward in the scores (see Table 19).

The spring mean raw score of 13.62 and the fall mean raw score of 11.98 resulted in a net loss of -1.64 raw score points, the second greatest difference on any of the tests. The analysis of variance treatment indicated a significant loss at the .0001 level (see Table 6). Sex of subject and school curriculum were found not to be significant factors effecting retention ability while IQ was significantly related ($df = 2$, $MS = 25.18$, $F = 3.58$, $p<.05$) to retention ability (see Table 7). Specifically, subjects in the average IQ group lost significantly more than their less intelligent peers.

Generally, a smaller percentage of male subjects in the objective-based group changed from the "masters" to "nonmasters" group when compared to basal reader group males. The same was not true, however, of females. In their case, there was no apparent pattern in changes from the "mastery" to "nonmastery" categories or vice versa (see Tables 10-13).

As might be anticipated, the overall trend of scores, as illustrated by the histogram, was toward the loss side of the scale rather than toward the gain side (see Figure 9, p. 57).

TABLE 19

FREQUENCY DISTRIBUTION OF WTRSD-
CONSONANT DIGRAPHS TEST SCORES

Raw Score	Spring	Fall
0	1	--
1	--	3
2	1	2
3	5	5
4	6	14
5	9	15
6	11	10
7	11	21
8	7	8
9	9	17
10	9	14
11	10	15
12	14	15
13	18	23
14	15	25
15	22	32
16	50	40
17	115	54

WTRSD-Compound Words

The low score and high score was the same for both the spring and fall tests (see Table 20, p. 56). While there was a general downward trend for the fall scores, the shift was not great. In fact, the overall loss between the spring and fall mean test scores was only -.60. While this still reached significance ($p<.001$), it was the least significant of the Wisconsin Tests of Reading Skill Development change scores which reached statistical signifiance (see Tables 5 and 6).

And, while the change score between means was found to be significant, the three independent variables of sex of subject, IQ, and school curriculum were not significantly related to retention ability (see Table 7).

The percentage of subjects recategorized on the "mastery-nonmastery" criteria was relatively small (see Tables 10-13). There was an actual increase in "masters" for the average, male, basal reader group. Another interesting phenomenon was discovered for above-average ability subjects. In their case, there was almost no change in the percentage of subjects needing to be recategorized between spring and fall. This was also reflected in the histogram where an almost "normal" bell-shaped curve of change scores appeared (see Figure 10, p. 57).

WTRSD-Contractions

Just as was found on the Beginning Consonants, Rhyming Elements, and Compound Words reading skill tests, the range of scores

TABLE 20

FREQUENCY DISTRIBUTION OF WTRSD-
COMPOUND WORDS TEST SCORES

Raw Score	Spring	Fall
0	--	--
1	--	--
2	--	--
3	2	4
4	3	2
5	5	7
6	5	10
7	2	8
8	10	13
9	11	11
10	8	8
11	17	22
12	15	26
13	27	26
14	38	24
15	51	50
16	73	45
17	46	57

Figure 7

Changes in Raw Scores on the
WTRSD-Rhyming Elements

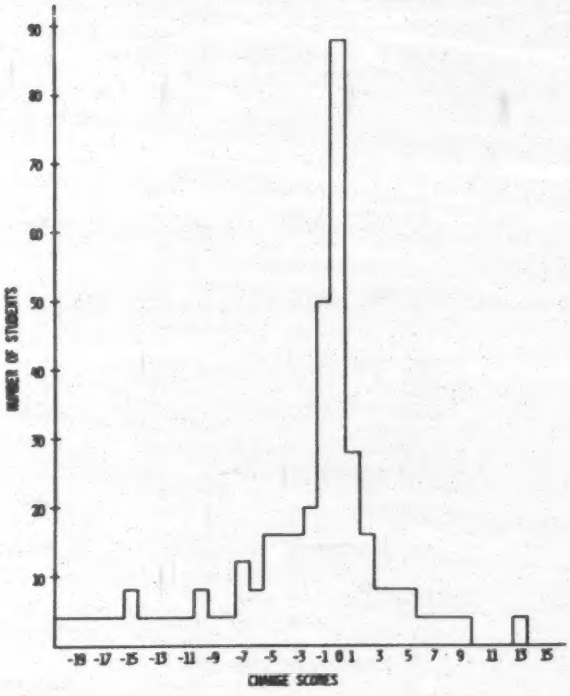


Figure 8

Changes in Raw Scores on the
WTRSD-Short Vowels

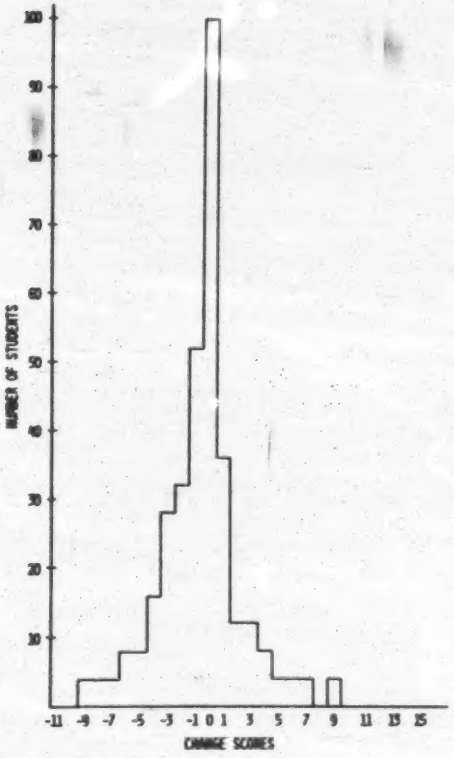


Figure 9

Changes in Raw Scores on the
WTRSD-Consonant Digraphs

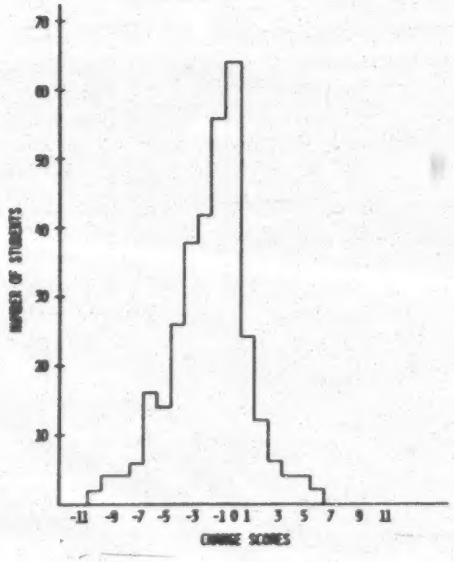
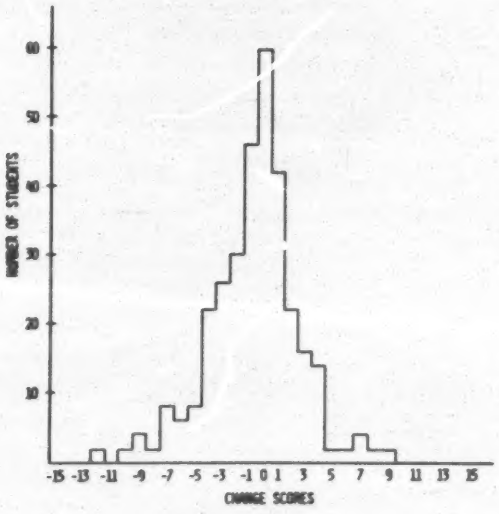


Figure 10

Changes in Raw Scores on the
WTRSD-Compound Words



on the Contractions test did not change between the spring and fall. The low score on this test was zero while the high score was fifteen points (see Table 21).

A difference of -1.19 points was found between the spring and fall mean scores of 10.77 and 9.58, respectively. The loss was significant at the .0001 level of confidence when the analysis of variance treatment was applied (see Table 6).

None of the three independent variables (sex, IQ, and type of school reading curriculum) was found to be significantly related to retention ability of this skill (see Table 7).

A large percentage of the basal reader group needed to be reclassified as "nonmasters" after the fall testing took place (see Tables 12 and 13). Between one-fifth and one-fourth of the males turned out to be "nonmasters" in the fall while one-third of the average intelligence females in this group moved from the "mastery" to the "nonmastery" category. Generally, the changes in the objective-based group were not as great.

The histogram was less "peaked" and its base was broader than many of the other histograms (see Figure 11, p. 66). This illustrated the trend for changes in scores to be distributed over a wider range than was true for many of the specific skill tests.

WTRSD-Base Words

Again, the range of scores was identical for the spring and fall test scores. A score of zero was the recorded low while the high was

TABLE 21

FREQUENCY DISTRIBUTION OF WTRSD-CONTRACTIONS TEST SCORES

Raw Score	Spring	Fall
0	1	1
1	5	--
2	7	15
3	10	16
4	14	28
5	14	19
6	14	21
7	12	13
8	10	15
9	17	13
10	13	15
11	19	20
12	21	27
13	42	29
14	52	28
15	62	53

the maximum achievable score of twelve. The frequency distribution of scores remained almost unchanged between the spring and the fall. Only a slight upward trend in scores was noticeable (see Table 22, p. 61).

This was one of two tests on which a loss between the two mean scores was not found over the summer vacation period. The spring mean score of 8.74 and the fall mean score of 8.95 resulted in a gain of .21 points (see Table 5). While the change of almost one-fourth of a raw score point was in the positive direction, it was not great enough to reach statistical significance (see Table 6). Moreover, none of the independent variables reached significance either (see Table 7).

There was relatively little change in the "mastery" versus "non-mastery" categories for the objective-based reading curriculum group. The one exception was for below-average IQ females where twenty-two percent of the group changed from "masters" to "nonmasters" (see Table 11). The basal reader curricula group experienced no decline in the number of "masters." In fact, the inverse was true. There were actually increases in the number of "masters" in the average intelligence male category as well as the above-average intelligence female group (see Tables 12 and 13). The latter group had in increase of nineteen percent in the number of "masters."

The pictorial representation of scores on the histogram revealed a slight upward trend in change scores (see Figure 12, p. 66). Almost the same number of subjects gained a raw score point, for example, as those who had no change between their spring and fall test scores.

TABLE 22

FREQUENCY DISTRIBUTION OF WTRSD-
BASE WORDS TEST SCORES

Raw Score	Spring	Fall
0	2	1
1	2	4
2	9	11
3	11	10
4	16	7
5	16	14
6	15	19
7	28	18
8	26	21
9	29	40
10	41	41
11	43	56
12	75	71

WTRSD-Plurals

On the Plurals specific skill measure, the range of scores in the spring was less than in the fall. The low of two points and the high of twelve points was substantially narrower than the fall test low of zero and the high of fourteen. It was also interesting to note the sharp increase in perfect test scores for the fall (see Table 23).

The spring and fall mean test scores were almost identical; 10.51 and 10.46. The loss of only -.05 of a raw score point was not found to be significant nor were sex of subject, IQ, or type of school reading curriculum found to be significantly related to retention of the skill (see Tables 5-7).

With the exception of twenty-three percent of the below-average ability females changing categories, there were almost no changes in the "mastery-nonmastery" objective-based curriculum groups. Approximately fifteen percent of the average ability males and fifteen percent of the average ability females in the basal reader curricula group, however, went from the "masters" to the "nonmasters" categories (see Tables 12 and 13). And, strangely, about one-fourth of the above-average ability females in the basal reader curricula group went from being considered "nonmasters" to "masters."

A large number of subjects' scores did not change between the spring and fall testing sessions. The histograms revealed, in fact, that most of the changes could be categorized between -2 and +2 parameters (see Figure 13, p. 66).

TABLE 23

FREQUENCY DISTRIBUTION OF WTRSD-
PLURALS TEST SCORES

Raw Score	Spring	Fall
0	--	1
1	--	1
2	1	2
3	1	--
4	3	4
5	6	10
6	5	7
7	6	14
8	11	12
9	19	18
10	44	22
11	133	80
12	84	141

WTRSD-Possessives

As on six of the previous eleven tests of specific reading skills, the range of scores for the spring and fall remained the same. In the case of the Possessives test, the low score was three points while the high was twenty points (see Table 24). This test was the second measure on which there was no spring-to-fall loss. Instead, a slight gain (+.18) was found between the spring mean raw score of 17.05 and the fall mean raw score of 17.23 (see Table 5). The Possessives test was the third measure on which no significant gain or loss was found (see Table 6). Sex of subject, intellectual ability, and type of reading curriculum were also found to be not significant variables effecting retention ability of first-grade subjects (see Table 7).

For objective-based curriculum subjects, there was very little change in the number of subjects which were considered "masters" in the spring versus "masters" in the fall (see Tables 10 and 11). This was not true, however, of their basal reader curricula contemporaries. Fifty percent of the average ability females in this group changed from being considered "nonmasters" in the spring to "masters" in the fall (see Table 13). This was the largest change on any of the specific skill tests.

The change score pattern for subjects, as illustrated on the histogram, found most scores unchanged between spring and fall (see Figure 14, p. 66). The changes that did take place were found primarily between the -1 and +2 categories.

TABLE 24

FREQUENCY DISTRIBUTION OF WTRSD-POSSESSIVES TEST SCORES

Raw Score	Spring	Fall
0	--	--
1	--	--
2	--	--
3	2	2
4	3	1
5	3	3
6	6	4
7	4	3
8	8	5
9	3	7
10	5	3
11	4	5
12	5	8
13	7	7
14	6	9
15	11	13
16	20	13
17	17	25
18	33	26
19	68	54
20	108	125

Figure 11

Changes in Raw Scores on the
WTRSD-Contractions

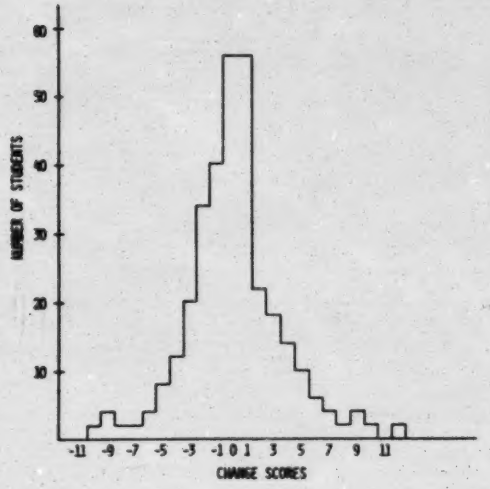


Figure 12

Changes in Raw Scores on the
WTRSD-Base Words

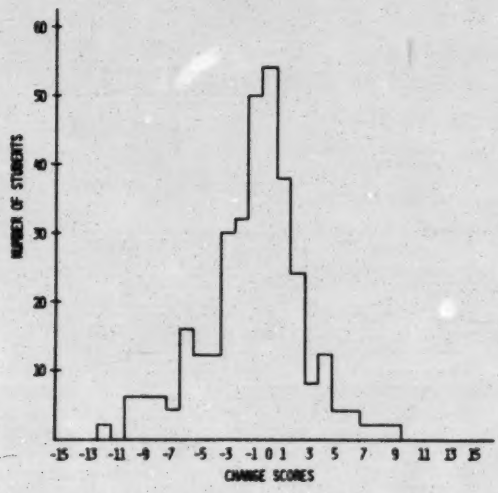


Figure 13

Changes in Raw Scores on the
WTRSD-Plurals

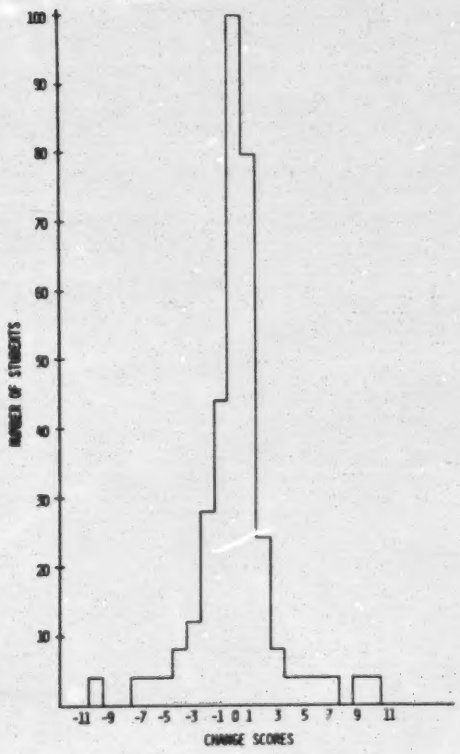
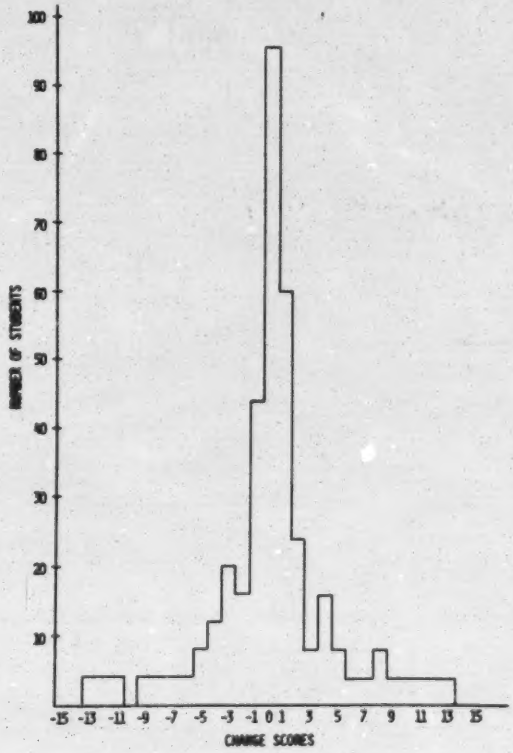


Figure 14

Changes in Raw Scores on the
WTRSD-Possessives



CHAPTER IV

DISCUSSION, CONCLUSIONS, AND SUMMARY

In this chapter, each hypothesis is discussed in terms of the results presented in Chapter III. Conclusions, pedagogical implications, and a summary of the study are provided.

Discussion

Hypothesis 1: There will be no significant difference between spring and fall Gates-MacGinitie Reading Test or Wisconsin Tests of Reading Skill Development reading scores.

Examination of the data presented in Table 6 indicates statistically significant losses on both measures of overall reading ability (Vocabulary and Comprehension) and on nine of the twelve tests measuring specific reading skills. The losses were significant at the .0001 level for eight measures, the .001 level for two measures, and the .01 level for one measure. Slight gains were found on only two of the remaining three tests. The gains were not significant, however.

It is interesting to note that the three tests on which no significant losses occurred were all measures assessing structural analysis reading skills. Six of the tests on which significant losses did occur measured phonic skills. One reason for the loss of reading skills may be related to the high degree of auditory discrimination ability required

of the subjects on phonic tests that require precise auditory acuity. It may be that the ability to discriminate, say, likenesses and differences in sounds is a highly sophisticated ability that is not maintained over the summer vacation period. If this is so, teachers may need to spend a specific amount of instructional time with children practicing the discrimination of sounds before any type of fall testing programs requiring this skill is undertaken.

If auditory discrimination ability was an important variable related to retention of scores, on the other hand, one is hard pressed to explain why the losses should occur on the Vocabulary and Comprehension tests as well as the Sight Vocabulary, Compound Words, and Contractions tests. None of these measures required a high degree of auditory discrimination in order for a subject to perform well. It appears, then, that further investigations into this area are needed before any adequate answers will be forthcoming.

It is important to examine Hypothesis 1 in terms of the practical application the findings have for the classroom teacher. The results of this study indicate that the scores on norm-referenced, standardized reading tests change markedly for some children, between the spring and the fall. It is interesting to speculate whether this change would exist after the pupils would have been in school for, say, one or two months instead of only two weeks. From the data presented in this investigation, it seems that teachers interested in measuring fall-spring reading achievement, utilizing standardized reading tests, should be aware of the fact that tests administered within two weeks after school resumes

in the fall might not be representing accurately the actual achievement of pupils.

Another issue pertaining to accuracy of scores relates to the confidence in test scores teachers can have for subjects who were administered criterion-referenced reading tests in the spring and considered to have mastered specific reading skills. Will they continue to demonstrate mastery in the fall of the year immediately following the summer vacation period?

On the whole, between nine and fourteen percent of the subjects enrolled in the objective-based curriculum and between nine and nineteen percent of the subjects enrolled in the basal reader curricula needed to be reclassified in the fall of the school year. It appears as if above-average IQ females tend to score the most consistently in terms of maintaining "mastery" scores, regardless of whether they have been enrolled in objective-based or basal reader reading curricula.

One other finding related to this hypothesis deserves further mention. The data presented here seem to bear out Elder's (1923) earlier finding that the range of scores in the fall of the year is greater than in the spring. The ranges of both the Vocabulary and Comprehension scores on the Gates-MacGinitie Reading Test were greater in the fall than in the spring. The increase in the range of scores was also evidenced by the criterion-referenced measures, although the increase was not as great as it was for the norm-referenced test.

Hypothesis 2: There will be no significant difference in retention ability between males and females.

The hypothesis that there would be no significant difference in retention ability between males and females was accepted unequivocally. There were no significant differences in retention ability between sexes on either the norm-referenced or the criterion-referenced tests. Evidently, while females may be better readers than males, at least in the United States (Johnson, 1972), they do not seem to be better at retaining either overall reading ability or specific reading skills over the summer vacation period.

Again, from a pedagogical point of view, it is important to consider whether more males or females need to be reclassified as "masters" or "nonmasters" in the fall of the year. The data indicate no consistent change patterns favoring either sex (see Tables 10-13). Even while there may be a slight trend for females to be less prone to be recategorized as "nonmasters," the difference between the sexes amounts to less than five percent in favor of the females.

Hypothesis 3: There will be no significant difference in retention between subjects of above-average, average, and below-average mental ability.

Hypothesis 3 was also accepted, but with two qualifications. First, with the exception of average IQ subjects losing a significant degree (Rhyming Elements, $p=<.01$; Consonant Digraphs, $p=<.05$) more than their more and less intelligent contemporaries, there were no significant differences in ability to retain information between groups (see Table 7). Or, to state it another way, there were no significant differences in

retention ability between the three IQ groups on forty of the forty-two comparisons. Moreover, the percentage of subjects needing to be recategorized as "masters" or "nonmasters" was similar for all IQ groups (see Tables 10-13).

Hypothesis 4: There will be no significant difference in retention ability of subjects enrolled in the objective-based reading skills program versus subjects enrolled in the basal reader curricula.

There was no statistically significant difference between the retention of scores for subjects in the objective-based curriculum versus those enrolled in spiral-curricula; therefore, Hypothesis 4 was accepted (see Table 7). While there was a slight increase in the mean fall score on the Base Words test for objective-based curriculum subjects, losses were found on the thirteen other measures. Gains were found on three of the tests (Base Words, Plurals, and Possessives) for the basal reader group. One reason for basal reader curricula subjects performing slightly better than their objective-based curriculum contemporaries may be related to the content found in the two curriculas. If, for example, the skills sequence of the basal readers emphasized structural analysis skills, such as plurals and possessives, one would expect better performance by children who had received instruction in this area. One other plausable explanation for objective-based curriculum subjects performing less well on the structural analysis skills may be, in part at least, due to their order of listing in the Wisconsin Design for Reading Skill Development continuum. Since the structural analysis skills are the final five skills at Level B, it is conceivable that teachers using the objective

based program relegated the teaching of these skills to a subordinate status and emphasized the teaching of sight vocabulary and phonic skills instead. If this was the case, one might expect the objective-based subjects to be inferior in the retention of these skills, since they probably would have had less opportunity to practice the skill during the academic year.

Conclusions

Four conclusions seem warranted on the basis of the results of this study. The conclusions have implications for both researchers and classroom teachers.

First, there is a significant loss in both overall reading ability scores and specific criterion-referenced reading test scores between the spring and fall of the year. The loss, however, should be examined in light of pedagogical as well as statistical significance. At first, one might be tempted to conclude that all subjects using criterion-referenced reading programs need to be retested on a yearly basis if these programs are to be implemented effectively. Such a testing program conducted each fall would insure that pupil reading skill records were current and accurate. Classroom teachers using these reading programs, however, are usually not concerned with statistical tests of significance and mean scores of subjects. Instead, they must deal with the operational effectiveness of reading programs on a day-to-day basis. What answers might this study provide then? Perhaps most important is the fact that a relatively minor number of subjects move from the "mastery" category in the spring to the "nonmastery" category in the fall. Generally, only around

fifteen percent of all the subjects tested in this study failed to remain classified as "masters" in the fall. In an average classroom of thirty students, this would mean that only about four or five students would need to be retested each fall.

Readers are also reminded that the subjects in this study were relatively young, and probably, since most were only in the beginning stages of learning to read, did not have opportunities for extensive practice in applying the reading skills as, say, a nine- or ten-year-old might have. Perhaps this lack of practice could contribute to the change in ability over the summer. Such claims are only speculative, however, and remain to be tested in other studies.

The results of this study do seem to indicate, then, that some subjects will need to be retested each fall. The number is not great, however. Certainly, it should be of some comfort to learn that fifty percent or more of the subjects do not need to be retested every year. Such an outcome might make a criterion-referenced reading program prohibitively expensive and pragmatically unmanageable.

The second conclusion reached, based on the results of this study, is that the ability to retain reading skills, as measured by both norm-referenced and criterion-referenced tests, does not differ significantly between first-grade males and females. While teachers are sometimes quick to suggest that the females in their classes appear to be better readers, the evidence obtained from this study suggests that they are not superior in ability to retain the skill of knowing how to read. The need, then, to test only boys in the fall of the year, does not seem warranted.

The third conclusion relates to how the intelligence of a subject (as measured by a standardized intelligence test) influences the ability to retain information. This investigation revealed that subjects of below-average intelligence did not differ significantly from their more intellectually able peers. A note of caution, however, needs to be stressed here. The size of the below-average IQ group in this study was small. It could well be that more subjects in this group would have influenced the results. Future investigations might want to focus specifically on this below-average IQ group when measuring retention of reading skills.

Finally, while it might be expected that subjects who were enrolled in the criterion-referenced curriculum would be more apt to retain the specific reading skills, when compared with their basal reader curricula peers, this was not the case. The basal reader curricula subjects, in fact, had lower change scores on eight of the fourteen measures. Evidently, the one year enrollment in the criterion-referenced program had little effect on the ability to maintain their previous spring scores.

In conclusion, there appear to be significant losses in reading ability when mean spring and fall reading test scores are subjected to the analysis of variance treatment. When the data are analyzed descriptively, however, there is only a minor change in the percentage of subjects considered "masters" of the specific skills in the spring to "nonmasters" in the fall. About fifteen percent of the first graders in this study changed from the "mastery" to the "nonmastery" category between the spring and fall. Sex of subject, intellectual ability, and type of school reading curriculum had little bearing on the ability to

retain either overall reading ability, as measured by the Gates-MacGinitie Reading Test, or specific reading skills, as measured by the Wisconsin Tests of Reading Skill Development-Word Attack, Level B.

Summary

This study was designed to assess the effect the summer vacation period has on the reading ability of first-grade subjects, as measured by norm- and criterion-referenced reading tests. The data were analyzed to determine if sex of subject, IQ, or type of school reading curriculum were related to the ability to retain overall reading ability or specific reading skills.

Method

Subjects in the study were 311 first-grade pupils enrolled in nine northeastern Wisconsin elementary schools. Approximately one-half of the subjects were enrolled in an objective-based reading program while the remaining subjects were enrolled in basal reader curricula.

All subjects were administered the Gates-MacGinitie Reading Test, Primary A, and the Wisconsin Tests of Reading Skill Development-Word Attack, Level B, two weeks prior to and two weeks after the summer vacation period. In addition, the California Short-Form Test of Mental Maturity was administered to all subjects during the spring testing sessions. Subjects with IQ scores which fell within the third or seventh stanines were not included in the data analysis. A multiple analysis of variance statistical treatment was used to analyze the data. Retention of reading scores between the spring and fall was the dependent

variable; sex of subject, intelligence, and type of school reading curriculum were the independent variables.

Conclusions and Implications

Statistically significant differences were found between the mean spring and fall test scores on eleven of the fourteen measures. Sex of subject and type of school reading curriculum were not significantly related to ability to retain reading skills. Intelligence of subjects was found to be related to retention ability on only two of the measures.

Fifteen percent of the subjects changed from being considered "masters" of the specific reading skills in the spring to being classified as "nonmasters" in the fall. Achieving a score of eighty percent or better on any of the specific skill tests was the criterion for mastery.

It was concluded that even though statistically significant losses occurred on most of the tests, the most meaningful measure of change was the difference between the percentage of subjects considered to have mastered the skills in the spring versus the percentage in the fall. The fifteen percent change between the two times was not considered great enough to suggest massive schoolwide retesting of all subjects in criterion-referenced reading programs. Instead, retesting of subjects might be done on the basis of teacher subjective judgment, thereby reducing considerably, the cost and time necessary to implement such a reading program.

In conclusion then, sex of subject, intellectual ability, and type of school reading curriculum do not appear to be important variables related to the retention of overall reading ability and specific reading skills. While significant losses were found on eleven of the fourteen measures,

when the data were examined in terms of percentage of subjects considered to have mastered the skills in the spring and fall, only fifteen percent of the subjects needed to be recategorized.

REFERENCES

Arnold, R. D. Retention in reading of disadvantaged Mexican-American children during the summer months. Paper presented at the International Reading Association Convention, Boston, Massachusetts, April, 1968.

Brueckner, L. J., & Distad, H. W. The effect of the summer vacation on the reading ability of first-grade children. The Elementary School Journal, 24, May, 1924, pp. 698-707.

Cook, R. C. A dozen summer programs designed to promote retention in young children. The Elementary School Journal, 52, 1952, pp. 412-417.

Cook, R. C. Vacation retention of fundamentals by primary-grade pupils. The Elementary School Journal, 43, December, 1942, pp. 214-219.

Elder, Harry E. The effect of the summer vacation on silent-reading ability in the intermediate grades. The Elementary School Journal, 27, March, 1927, pp. 541-546.

Gates, A. I., & MacGinitie, W. Gates-MacGinitie Reading Tests, Primary A, Forms 1 and 2. New York: Teachers College Press, Teachers College, Columbia University, 1965.

Golhor, H., & McCrossan, J. An exploratory study of the effect of a public library summer reading club on reading skills. The Library Quarterly, 36, 1966, pp. 14-24.

Hillerick, R. L. Pre-reading skills in kindergarten: a second report. The Elementary School Journal, 65, March, 1965, pp. 312-317.

Irmina, Sister M. The effect of summer vacation on the retention of the elementary school subject. Catholic University American Research Bulletin, 1928, pp. 3-99.

Johnson, D. D. An investigation of sex differences in reading in four English-speaking nations. Technical Report No. 209. Wisconsin Research and Development Center for Cognitive Learning, The University of Wisconsin, Madison, Wisconsin, February, 1972.

Keys, N., & Lawson, J. V. Summer versus winter gains in reading school achievement. School and Society, 46, 1191, October 23, 1937, pp. 541-544.

Kolberg, O. W. A study of summer-time forgetting. The Elementary School Journal, 34, 1934, pp. 281-287.

Miles, P. J., Kamm, K., Harris, M., Stewart, D. M., & Weck, A. Wisconsin Tests of Reading Skill Development-Word Attack, Test Administrator's Manual. Minneapolis: National Computer Systems, Inc., 1970.

Morrison, J. C. What effect has the summer vacation on children's learning and ability to learn? Ohio State University Educational Research Bulletin, October 1, 1924, pp. 245-249.

Orr, D. B. Retention in educable mentally retarded children of material presented by simultaneous reading and listening. Paper presented at the International Reading Association, Seattle, Washington, 1966.

Orr, W. C. Retention as a variable in comparing programmed and conventional instructional methods. Journal of Educational Research, 62, September, 1968, pp. 11-13.

Otto, W., Kamm, K., Miles, P., Van Blaricom, V., Harris, M., & Stewart, D. Wisconsin Tests of Reading Skill Development-Word Attack, Level B, Forms 1 and 2. Minneapolis: National Computer Systems, Inc., 1970.

Parsley, K. M., & Powell, M. Achievement gains or losses during the academic year and over the summer vacation period: A study of trends in achievement by sex and grade level among students of average intelligence. Genetic Psychology Monographs, 66, 1962, pp. 285-342.

Scott, L. F. Summer loss in modern and traditional elementary school mathematics programs. California Journal of Educational Research, 18, 3, 1967, pp. 145-152.

Spitzer, H. Studies in retention. Journal of Educational Psychology, 30, 1939, pp. 641-656.

Sullivan, E. T., Clark, W. W., & Tiegs, E. W. California Short-Form Test of Mental Maturity, Level O. Monterey, California: California Test Bureau, 1963.

Townsend, A. Growth of independent-school pupils in achievement on the Stanford Achievement Test, Educational Records Bureau, 56, 1951, pp. 61-67.

Vergason, G. A. Retention in educable retarded subjects for two methods of instruction. American Journal of Mental Deficiency, 70, 1966, pp. 683-688.

APPENDIX A

FACTORIAL TABLE FOR THE STUDY

	Males						Females					
	Below-Ave.		Average		Above-Ave.		Below-Ave.		Average		Above-Ave.	
Skill	Spiral	Obj.	Spiral	Obj.	Spiral	Obj.	Spiral	Obj.	Spiral	Obj.	Spiral	Obj.
Vocabulary												
Comprehension												
Sight Vocabulary												
Beginning Consonants												
Ending Consonants												
Consonant Blends												
Rhyming Elements												
Short Vowels												
Consonant Digraphs												
Compound Words												
Contractions												
Base Words												
Plurals												
Possessives												

SUMMARY OF ANALYSIS OF VARIANCE:

SEX

Variable	df	Mean Squares	Univariate F	P
Gates-MacGinitie-Voc.	1	56.40	1.28	NS
Gates-MacGinitie-Comp.	1	191.29	7.98	NS
WTRSD-Sight Voc.	1	37.19	5.99	NS
WTRSD-Beginning Cons.	1	3.97	.79	NS
WTRSD-Ending Cons.	1	9.72	1.11	NS
WTRSD-Cons. Blends	1	17.47	1.65	NS
WTRSD-Rhyming Elem.	1	13.62	.62	NS
WTRSD-Short Vowels	1	1.59	.26	NS
WTRSD-Cons. Digraphs	1	1.85	.26	NS
WTRSD-Compound Words	1	2.53	.26	NS
WTRSD-Contractions	1	10.67	.98	NS
WTRSD-Base Words	1	33.76	3.47	NS
WTRSD-Plurals	1	2.16	.42	NS
WTRSD-Possessives	1	4.35	.47	NS

SUMMARY OF ANALYSIS OF VARIANCE:

INTELLIGENCE

Variable	df	Mean Squares	Univariate F	P
Gates-MacGinitie-Voc.	2	9.39	.21	NS
Gates-MacGinitie-Comp.	2	.90	.04	NS
WTRSD-Sight Voc.	2	5.55	.89	NS
WTRSD-Beginning Cons.	2	5.36	1.07	NS
WTRSD-Ending Cons.	2	13.28	1.51	NS
WTRSD-Cons. Blends	2	20.57	1.94	NS
WTRSD-Rhyming Elem.	2	133.86	6.10	<.01
WTRSD-Short Vowels	2	9.18	1.51	NS
WTRSD-Cons. Digraphs	2	25.18	3.58	<.05
WTRSD-Compound Words	2	19.27	1.94	NS
WTRSD-Contractions	2	8.50	.78	NS
WTRSD-Base Words	2	17.67	1.81	NS
WTRSD-Plurals	2	4.94	.96	NS
WTRSD-Possessives	2	5.22	.56	NS

SUMMARY OF ANALYSIS OF VARIANCE:
CURRICULUM

Variable	df	Mean Squares	Univariate F	P
Gates-MacGinitie-Voc.	2	55.47	1.26	NS
Gates-MacGinitie-Comp.	2	.95	.04	NS
WTRSD-Sight Voc.	2	6.20	1.00	NS
WTRSD-Beginning Cons.	2	.67	.14	NS
WTRSD-Ending Cons.	2	3.04	.35	NS
WTRSD-Cons. Blends	2	8.68	.82	NS
WTRSD-Rhyming Elem.	2	53.44	2.44	NS
WTRSD-Short Vowels	2	3.74	.62	NS
WTRSD-Cons. Digraphs	2	.91	.13	NS
WTRSD-Compound Words	2	8.64	.87	NS
WTRSD-Contractions	2	13.99	1.29	NS
WTRSD-Base Words	2	.89	.09	NS
WTRSD-Plurals	2	2.58	.50	NS
WTRSD-Possessives	2	5.35	.58	NS

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